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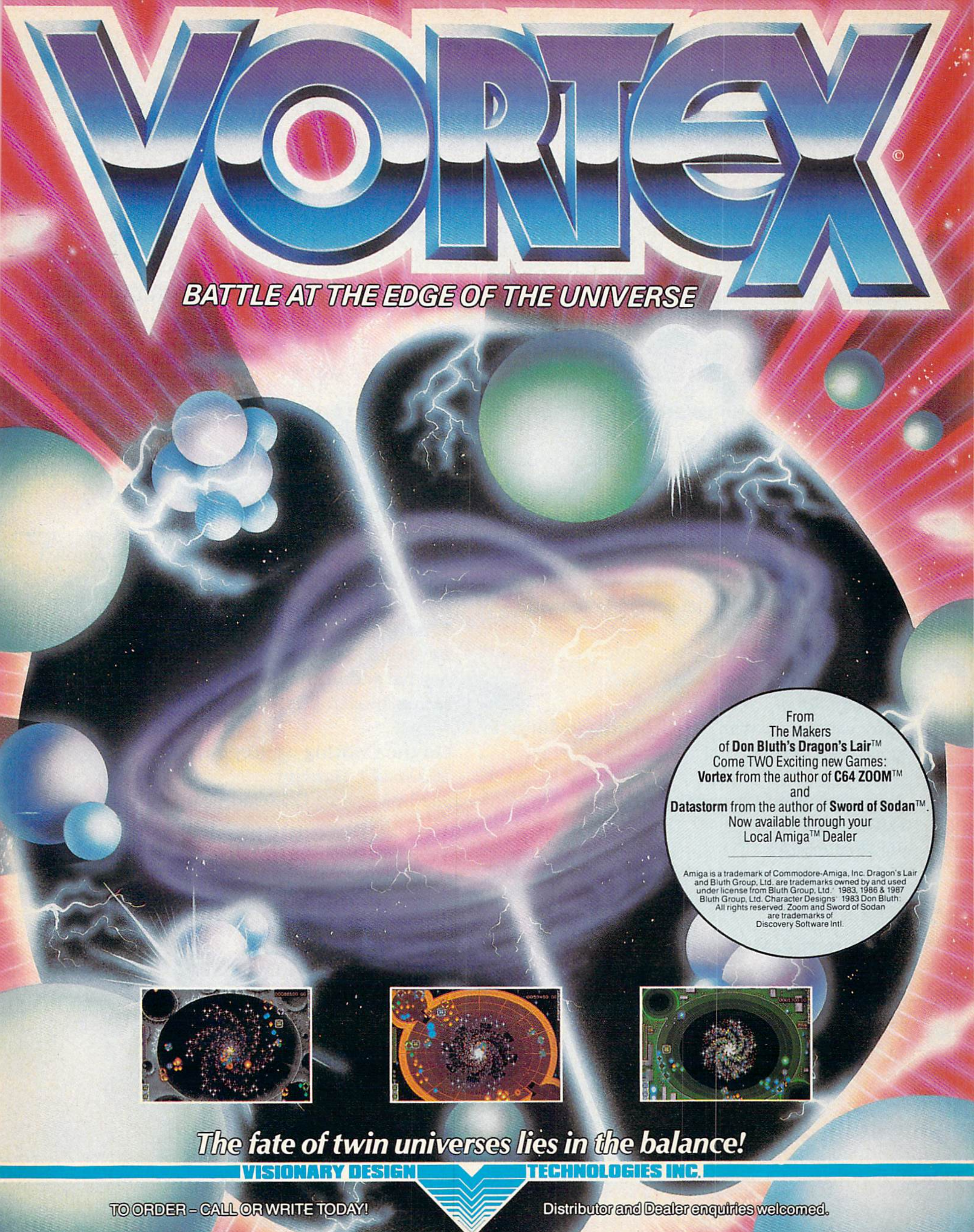
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Dear Amazing Computing:

I am considering the purchase of an A501 internal RAM expansion module for my Amiga 500. It is my understanding that some programs will not run with expansion memory present. Do you know of any switchable internal expansion modules or software fixes, such as the INT-SWITCH available in England through George Thompson Services, as advertised in the November 1988 issue of Amiga User International? Any information about such hardware or software would be greatly appreciated.

Thank you very much for your time and consideration.

Sincerely,

Arnold H. Szporn, M.D.
Teaneck, NJ

Dear AC,

If there is anyone that keeps track of these sorts of things, the Amiga recently appeared in another interesting place. On the 15th of February CNN broadcasted a story about a developing hole in the ozone layer at the North pole which matches a previously discovered hole at the South pole. An Amiga 2000 was used to display a computer-generated, false-color image of data collected by Canadian researchers at the North pole.

Sincerely,

Kenneth Jennings
APO, NY

Dear Amazing Computing,

Thank you for the article "Industrial Strength Menus" in the January AC. Robert D'Asto explains the mysteries of structures so well, and he so thoroughly covers the various points that he brings up, that his article answered many questions of mine concerning the finer points of using AmigaBASIC. Truly, as the one heading put it, this is "Programming Mysteries Revealed."

I hope that Mr. D'Asto can be prevailed upon to give more guidance to those of us who find that AmigaBASIC is a friendly, and challenging programming tool.

My main interest with the Amiga deals with BASIC. I have just renewed my subscription to AC and ordered back issues to complete my collection of the last two years. I find it a most interesting magazine at first reading, and a valuable reference source for tips, reviews, and addresses.

I am delighted to see the BASIC-oriented articles, and I hope you will print many more like this one on "Menus".

Keep up the good work.

Yours sincerely,

Francis J. Martin
Smithers, B.C. Canada

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Thank you,
Philip Markgraf - Sysop.
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Dear AC,

I have an Amiga 2000 with a bridgeboard. Recently I purchased a Proram 2000 memory expansion board with 2 megabytes installed. After installing the board in accordance with instructions in the manual, I ran the memory test diagnostic software which came with the Proram 2000. Almost at once it informed me that I had too much memory. Inasmuch as the board will hold 8 megabytes, I was puzzled. I was unable to get through to Progressive Peripherals by telephone. My mail order vendor was not able to help but agreed to ask Progressive Peripherals to call me. They never did. It finally occurred to me that the bridgeboard might have something to do with the problem. With the bridgeboard removed, the diagnostic software worked just fine. I ran it through three complete thirty-five minute cycles. All was well. I reinstalled the bridgeboard and found everything worked as expected, the PC programs, the memory expansion, everything.

So the Proram 2000 works with the bridgeboard. Its diagnostic software does not. This is a minor inconvenience for such an otherwise fine product.

Sincerely,

Hubert C. Minard
Margate, FL

Dear AC,

First of all, I'd like to say that I really enjoy your magazine. It has evolved into a useful tool next to my Amiga, unlike other magazines that collect fluff and dust.

Next, I'd like to tell you about a problem I've been having using LIBRARY calls. No matter how many times I tried, I could not get one to work. Then one day I noticed that my .bmaps files were all saved to disk in lowercase letters, and that my BASIC programs were all written in uppercase letters. Desperate and determined, I decided to rename my .bmaps, using all capital letters. The programs now work, but why couldn't BASIC recognize the .bmaps while they were in lowercase?

(continued on page 22)

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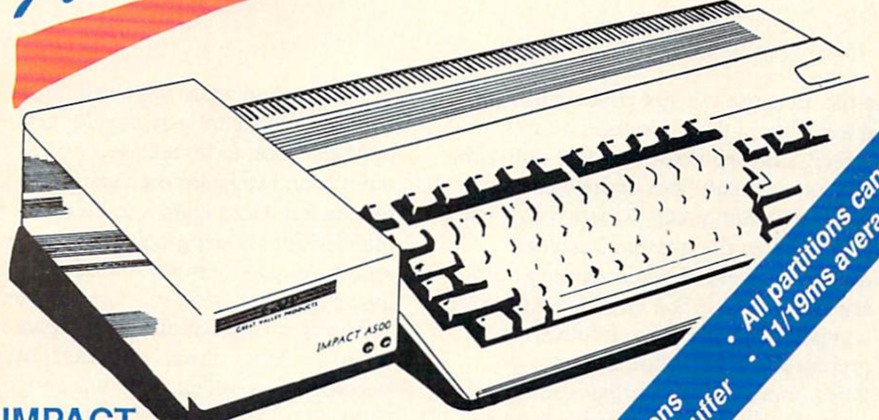

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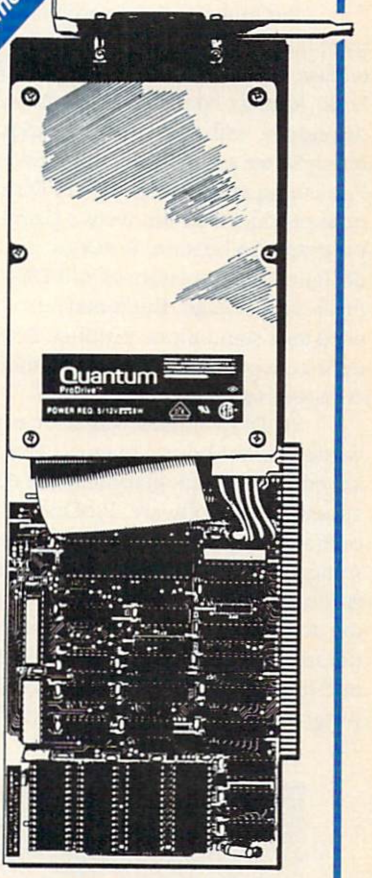

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GOLD DISK's

Professional Draw 1.0

by R. Shamms Mortier, PhD.

The Amiga painting software wars have taken another step forward with the release of Professional Draw by Gold Disk. Already heralded as a primo Amiga developer, with titles like ComicSetter, MovieSetter and their line of Desktop Publishing masterworks, Gold Disk has now produced an innovative painting program. To be sure, ProDraw is designed to supplement Gold Disk's Professional Page. But it may also be used as a stand-alone product. It will definitely parent a whole new line of competitive wares.

ProDraw comes with a clearly written, spiral-bound manual. The text is keyed to the same graphic icons that appear in the software. ProDraw operates very differently from other Amiga paint programs in that, instead of storing the bitmap data for the visuals on the screen, ProDraw is concerned with the mathematical nature of each structure and line. ProDraw is a vector graphics program, the first dedicated to the Amiga artist. Because it is not concerned with the quality of the illustration on the screen, finished work can fully utilize the resolution capabilities of the printer. Although print quality is best with a laser printer, even the humble 9-pin dot matrix can achieve some startling results. My Canon PW-1156A (which is EpsonFX-compatible) is able to print ProDraw graphics with very little evidence of those unprofessional "jaggies" that mar a printed piece, making it immediately identifiable as a dot matrix. This means your dot-matrix output rivals what you'd expect from a plotter! Your screen is capable of displaying about 65 dots-per-inch (DPI), while a laser printer comes in at about 300. As the manual states, a Linotronic 300 with a Postscript processor can output 2400 DPI! The ease with which ProDraw accomplishes this makes the manual almost unnecessary after a session or two of use. There are amazingly few main commands to become familiar with.

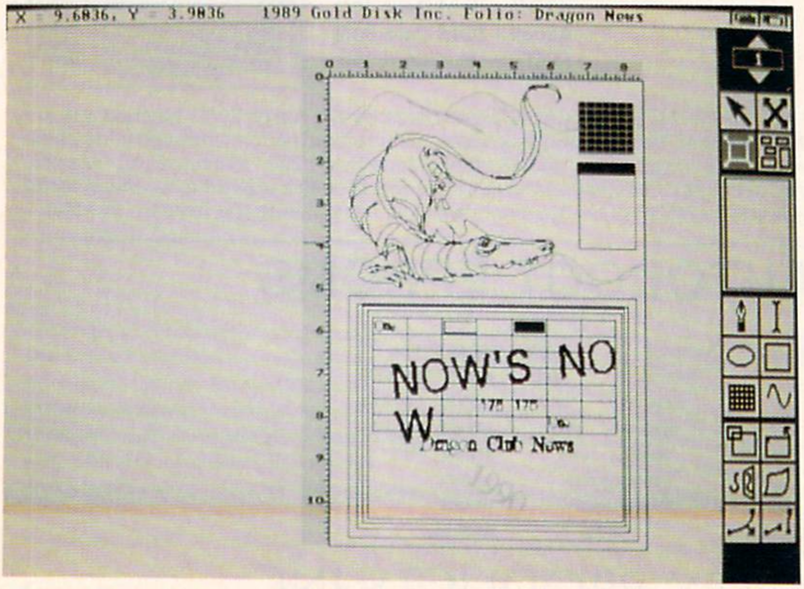
X = 9.6836, Y = 3.9836   1989 Gold Disk Inc. Folio: Dragon News
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Figure One: *In a sense, ProDraw is meant to be as much a manipulation program as an on-board drawing system.*

At a time when we've all become almost jaded to the way developers talk up their "soon to be released" wares months and years before they actually hit the market, Gold Disk is to be commended for allowing only about three months to pass between initial advertising and product release. This attitude, still abused by a handful of companies (need I mention them by name?), has become so prevelant that I was indeed shocked to find my copy of ProDraw in the mailbox less than sixty days after ordering it from my favorite mail-order house. I was really expecting it in late Spring. How easily we consumers are conditioned to being mistreated.

Because I've been at this Amiga dance for almost three years, my favorite way of working with a new piece of software is to jump right in and see how long I can play around intuitively until Mr. Guru stops the action. I find that Amigans own many packages, and even their favorite ones may be used every day. When users do come back to these packages, it may not be with beginner's mindset. The packages should be friendly enough so users don't have to spend too much time reviewing the manual. With all this in mind, I made a working copy of ProDraw when it arrived (it's not copy-protected), and entered its brave new world. My immediate reaction was that it had a similar feel to some of the standard graphics packages for the Big Blue environment, except those packages do not give you printed output anything like ProDraw.

Manipulation and Drawing

In a sense, ProDraw is meant to be as much a manipulation program as an on-board drawing system. Its way of interacting with Amiga IFF files is both novel and vital. As a cousin of Profes-

(continued)

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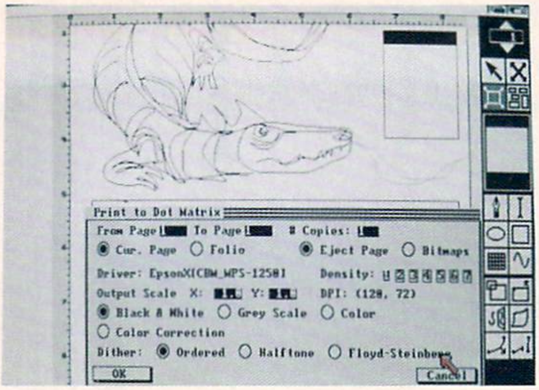
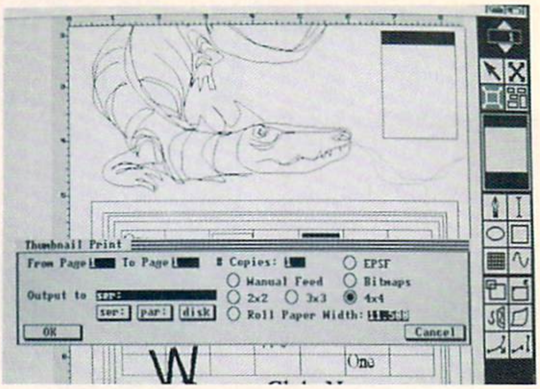
Figure Two (left)
For those of us not endowed with laser printer access, there is a "dot matrix" setting



Print to Dot Matrix
From Page To Page # Copies:
● Cur. Page ○ Folio ● Eject Page ○ Bitmaps
Driver: EpsonX[CBM_MPS-1250] Density: 1 2 3 4 5 6 7
Output Scale X: Y: DPI: (120, 72)
● Black & White ○ Grey Scale ○ Color
○ Color Correction
Dither: ● Ordered ○ Halftone ○ Floyd-Steinberg

Figure Three (right)
With the Thumbnail setting, you can get a proof of four, nine, or sixteen pages in a folio, all printed out on one page.



Thumbnail Print
From Page To Page # Copies: ○ EPSF
○ Manual Feed ○ Bitmaps
Output to ○ 2x2 ○ 3x3 ● 4x4
○ Roll Paper Width:

sional Page, ProDraw concerns itself with Desktop Publishing characteristics, rather than videographic possibilities. This is especially true in the way it handles and relates to color. Rather than focusing on the display of multicolored aspects of the art on screen, ProDraw instead focuses on those color attributes most important to Desktop Publishing—gray levels. But color information is not "lost" if you import an IFF painting. It's just stored as optional output information.

When you first open ProDraw, you are presented with a blank slate. If you do what I did, and just start creating your designs at this juncture, you will eventually Guru. ProDraw really expects you to first go to the menu and "Create" a new page. The blank opening is where one loads in a previously saved "folio". A folio can consist of one or several pages of work which can be edited and deleted just like pages can.

If I wasn't such a bullheaded old RAM, instead of charging in and running headlong into the Guru, I would have at least cracked open the manual. Chapter Three, the first really instructive part of the text, is a pretty thorough tutorial. After about two frustrating crashes, I finally opened the manual.

"Pages" can be created, saved, loaded, deleted, or altered (edited). The first thing you'll want to do is create one, which brings up the page format requester. ProDraw works with Workbench 1.3 or later because only these versions offer the printout parameters (halftoning, multiple striking, etc.), which are vital boundaries to desktop publishing adventures. The page format requester lists the number of the page you are working on, size input boxes and buttons, margin sets (top, right, bottom, and left), and a separate clickable area to bring up the Postscript Output Specs. If you are accessing a Postscript compatible printer (Apple Laserwriter, or a Postscript-compatible typesetting machine), then the Postscript requester gives you even more control over your output. Your work can be positioned, scaled, rotated, and set up for "crop-marks" and "bleeds".

If "no-eject" is selected, the page will not be ejected after it is printed, but will remain in a waiting state so another page can be printed on top of it. Clever. After you set up these parameters, and your work is ready to print, select "Postscript" in the "Output" selection of the Project menu.

Postscript

Here you are presented with another round of choices. You can print the current page or all pages in a "folio" set. Pages can be mirrored, printed as negatives, or combined with bitmaps (IFF's). You can choose a serial, parallel, or disk device, and set a roll-paper width. The color separating capabilities Gold Disk introduced in Professional Page are also listed here. You can do full process color separation including density, angle of the screen, and 3 or 4 color.

For those of us not endowed with laser printer access, two other printing options are possible. I've already mentioned the "dot matrix" setting above, and I can't laud it enough. With a newer ribbon, the results can be awesome. Of course, as the manual advises, one could use a professional printing service since ProDraw can save a Postscript file.

The third setting is called "Thumbnail". Thumbnail shows Gold Disk's attention to graphic arts and desktop publishing. With this setting, you can get a proof of four, nine, or sixteen pages in a folio, all printed out on one page. Creating objects with ProDraw is fairly easy. The menu which runs along the right edge of the screen has all the mouse-selectable tool icons. The pen icon allows for the point to point construction of Bezier curves, of which straight lines are a subgroup. All shapes can be filled or unfilled.

Bezier Curves

The manual insists you go through a tutorial—the construction of a clown poster—utilizing mostly Bezier curve structures. Considering you also have access to a freehand drawing tool that automatically generates the necessary mathematics for Bezier curves, I find this to be unnecessary torture. This isn't the first time I've tried to be creative with the elusive Bezier curve. Except as a way to generate smooth transitions in a chart or graph, I find it a second-rate drawing tool, especially for illustration.

It can serve, however, as a way of generating curves that are too long to draw smoothly in a freehand fashion. It is an essential tool, but the tutorial should walk through it and center upon ends other than illustration. A saving grace is that curves can be readjusted much after the fact. The TAB key acts as a cloning operator, copying the chosen drawing or group of lines by activating the "Null Pointer" tool. This can produce some startling results when used in combination with a moving object, much like painting with a "brush".

Ellipses and rectangles can be drawn filled and unfilled. Using the ALT key while sizing them constrains them into circular and square parameters. All filling operations are subject to a choice

(continued)

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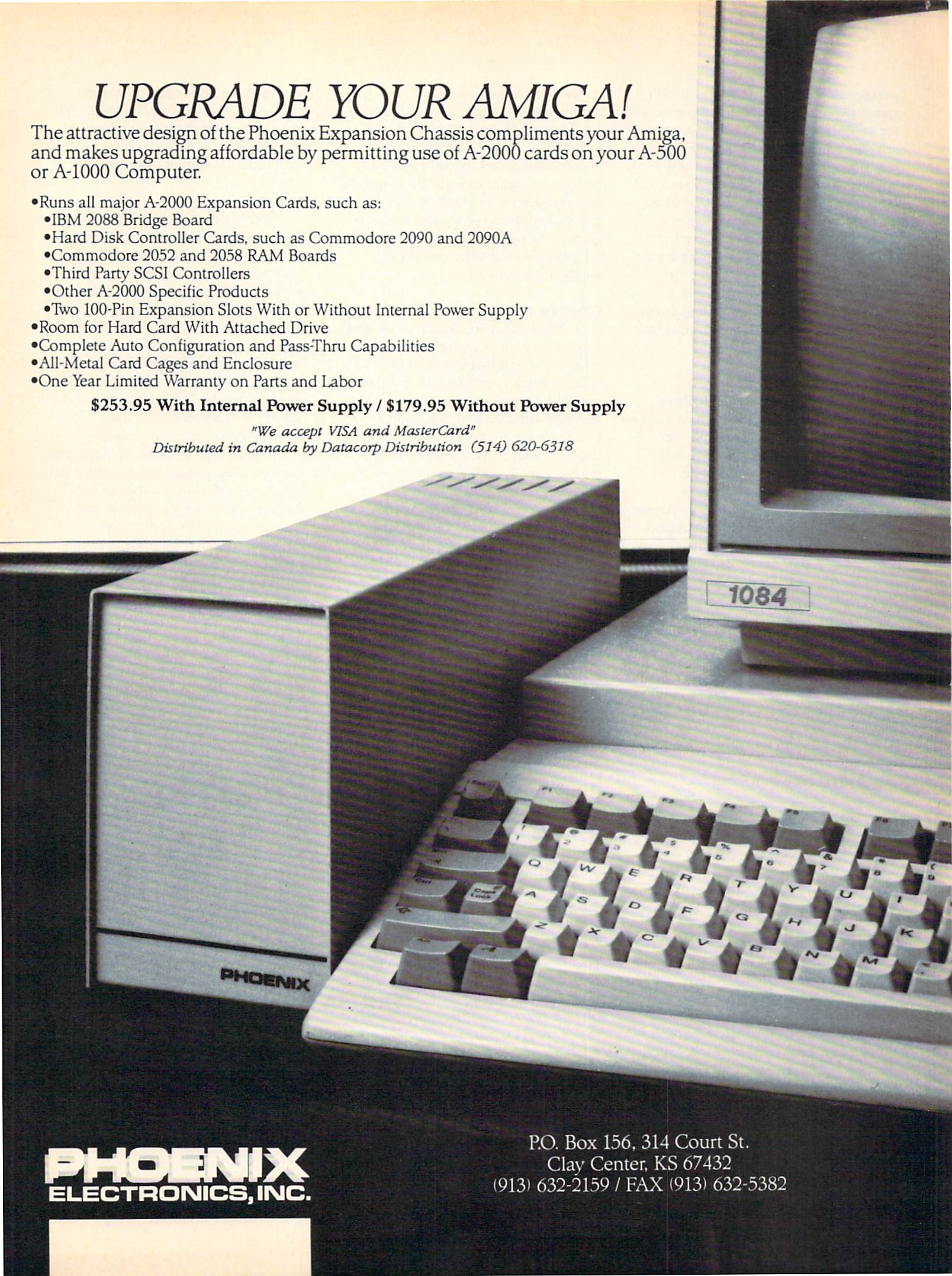

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of palette options, either gray scale fills, specific colors, or user-defined colors. All the colors are simultaneously indicated as Cyan-Magenta-Yellow components, ready for process color printing and color separation. Once on the screen, all objects can be moved to any part of the page by several tools and methods. Switching the WYSIWYG mode off speeds up drawing time and refresh time considerably, as does fixing all previously drawn objects to the screen. Although one Meg of RAM is suggested, you'll be far better off if you have access to more.

The Freehand Tool

My favorite tool is the Freehand tool because it has the "feel" of an artist's brush or pen (several line widths and styles are possible). With the Freehand tool, each shape you draw before releasing the left mouse button is redrawn on the screen with all the Bezier curve math worked out for you, including the editable control points. Although the screen shakes rather discomfortingly in HiRes (the defaulted choice), The Freehand tool's "Hairline" mode allows for very fine control of the illustration, so an artist can achieve some very impressive results. Again, I fail to see many situations that would provoke me to select the Bezier curve option over the Freehand tool, but every artist has her day.

The Rotation tool is nice, but I found it to consume a lot of computing time before displaying the result. Patience is definitely required. Any active object can also be twisted using the distortion tool. By rotating and distorting a drawing, it is possible to achieve a warmer, more human quality instead of that cold, hard, mechanical look. Both are necessary in the artist's toolbox. Objects can also be sent to the front or back of others quite fast, so various tests can be made on the compositional quality of one's creations.

The spacebar refreshes the screen which, at times, is quite necessary. This is because very complicated work sometimes overrides work already on screen, so lines and objects apparently get erased. Another way this can be accomplished is by altering the magnification level.

I find the magnification tool to be most useful. A page can be magnified up to eight times its normal size. The most detailed work imaginable can be accomplished. It takes a few minutes to get the hang of the way ProDraw's magnification tool operates but, once you do, it becomes second nature. Any bitmapped import can also be magnified and overlayed with Vectored lines, curves, and shapes. As magnification is altered, the rulers at the left and top of the page also show the new measurments and coordinates.

Other Tools

There are more drawing tools and manipulation tools not yet mentioned. A most useful gridding capability responds to both resizing and color choices. The grid and other intersecting lines on a rectangle can be set to Butt (with a triangular notch), Bevel (a forty-five degree corner), Miter (a ninety degree corner), and Round (a semi-circular corner).

There is a separate sizing tool which takes a while to get the hang of. In the beginning, I kept getting resized objects that filled the screen. Only the vertical and horizontal parameters are affected here. The ESCAPE key aborts the operation of most tools. There is a "hook" tool, which reminds me of the tool in Aegis' Animator and does virtually the same thing, adding control points to selected curves for later readjustment. A "cutting" tool allows you to sever curves, creating two objects out of one.

Text Manipulation

What would a desktop publishing utility be if it couldn't handle text creatively? Nothing at all. Fortunately, ProDraw allows the user to manipulate textual objects over a wide spectrum of alteration and change, resizing, spinning, colorizing, outlining—all the required parameters. Only two fonts, Times and Univers, are included with the package. More will likely be coming down the pike in the future. These are structured fonts, making them print in the maximum resolution your printer is capable of, with few (if any) "jaggies". The folks in the office I work in couldn't believe the output came from a dot-matrix printer. Imagine, "O's" and other curvy letters printed on all degrees of slant without jaggies. Will wonders never cease?! The drawback here is you are limited to only 256 characters at a time. But remember, this was not meant to be a desktop publishing program, just a very useful utility for graphic vignettes. Besides, you could always string lines of text together if need be. Each font has several sizes of typeface, as well as being open to all the editing functions.

Bitmaps?

Yes, Virginia, bitmaps too. All those IFF files can be loaded into ProDraw, where they can be either sharpened up (painted over) or combined in unique ways. The first thing I experimented with here was importing two very complicated HiRes charts in 16 color HiRes. A page of ProDraw will hold two such pieces, and I stacked them one on the other. Then, with the help of the magnification tool and the great printing options of Workbench 1.3, I was able to print out my work to my printer.

With a little more experimentation, I can visualize printed results from a dot matrix that will almost duplicate the sharp quality of an Amiga slide. Hard copy at an affordable price! The output can be in sixteen gray levels or in full color, depending on what printer is chosen. IFF's are displayed on the screen in only four gray levels, but the program seems intelligent enough to choose these with care. The manual suggests you change the aspect ratios of imported IFF's (increasing the vertical by 1.16 or 2.32). IFF's of any resolution can be imported, including HAM. All of the color information is saved so, when printed on a color device, everything will be in spectral order. Bitmapped graphics can be cropped and resized.

What the Amigans know as "windows" or "brushes", ProDraw calls "clips". Clip libraries can be created, saved, and accessed (and I'll bet we'll be seeing some dedicated ones from Gold Disk and third parties soon). After they are selected, Clip libraries are named with DEFINE, DELETED, and dropped onto a page with DRAW. The SAVE item in the Clip menu saves all the clips in your library thus far. LOAD gives you access to a saved library.

In true caring, professional fashion, ProDraw's manual advises you on color, printing (including output service bureaus), color separation, and advanced separations. There are also tips on

(continued on page 47)

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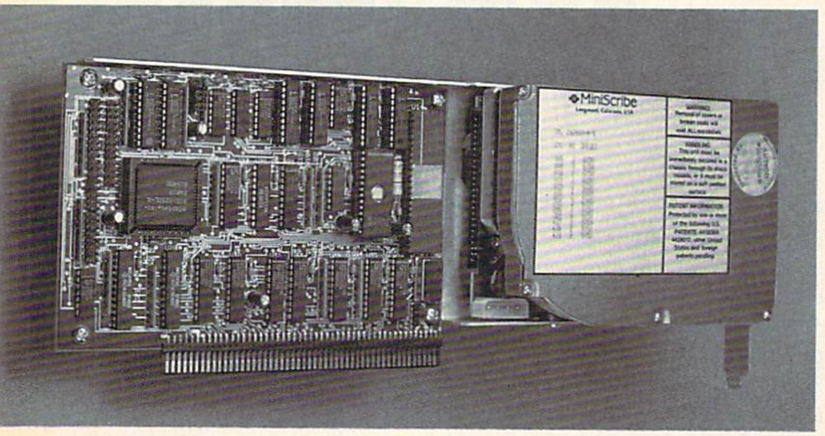

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reviewed by
David Duberman

Picture this tranquil scene: Waves lap gently at the shore, clouds waft past high in the sky, and reeds rustle softly at the water's edge. A bird or two flies by and, occasionally, a brilliantly colored fish leaps out from the water to snap at a bug. Now picture a similar scene on your Amiga's screen, created by you. Never happen, you say? Well, I say take a look at DeluxePaint III and think again.

Paint programs "paint" pictures on the computer screen using a mouse or digitizing tablet. They offer tools which allow unskilled artists to render their visions with relative ease. Because pictures are created in the computer's memory, one can experiment extensively and do no harm to the original. Once an image is completed, you can export it to other programs, or print it in color or black and white.

Dan Silva's DeluxePaint II has long reigned as the king of Amiga paint programs. In fact, DPaint is probably the most widely used Amiga program in existence, its popularity having propelled Electronic Arts to market versions for other computers.

Although Electronic Arts will continue to sell DPaint II for some time at a reduced price, it's been effectively deposed by DeluxePaint III, which Silva also designed and programmed. DPaint III begins with DPaint II's interface and takes off running—into animation territory. While its animation capabilities are not as flexible as those of its closest competitor, Gold Disk's MovieSetter, DPaint III has built-in transformation capabilities that MovieSetter does not. The program is a powerful tool which, while fully worthy of professional graphic artists and animators, can still be learned easily by those with little or no computer experience.

DeluxePaint III costs $149.00 (suggested list), 25% more than II. But if you already own II, you can upgrade directly through Electronic Arts for a relatively small fee. Contact the company for details. The manual is attractively packaged and accompanied by a reference card and three disks: the program disk, an Art disk, and an Animation disk, none of which are copy-protected. The program installs easily on a hard disk, an important plus for serious animators since graphics data can eat up a lot of disk space.

When DeluxePaint III first begins, you are presented with a requester listing available graphics modes and maximum number of colors. Several new choices appear here, including an Overscan gadget and one for 64 colors. By selecting Overscan, you can paint all the way out to the screen borders, a first for Amiga paint programs. And if you are using a 320-pixel-wide graphics mode on a late model Amiga, you can paint in the 64-color Extra Halfbrite mode. This gives you an extra set of 32 colors which are exactly half the brightness, or value, of the palette's first 32 colors. The program still supports all other modes except HAM, with or without Interlace.

Next, a blank screen appears with a Toolbox at screen right and a menu bar overhead. You can go right to work by clicking on a tool icon, a color to draw with, and then on the screen. Basic drawing tools include freehand dotted and solid lines, rubber band straight and curved lines, airbrush, area fill, and solid and hollow shapes (rectangle, circle, oval, polygon). There's a variety of sizes and shapes of resizable built-in brushes, and you can create custom brushes of any shape and appearance by picking up part of your drawing. You can use custom brushes with all the basic drawing tools, and for special effects as well.

DPaint III lets you apply a practically endless variety of quite remarkable transformations on custom brushes. You can stretch or shrink them, rotate them at any angle, or perform pseudo 3D-perspective transformations. The brush can be used repeatedly to fill enclosed areas on the screen, with or without the perspective settings applied. One of III's innovations lets you fill any shape with a single copy of the brush, warping the original shape to fit the new one. And there's more good news—call fill commands work much faster than before.

The text tool lets you type on the screen using any Amiga font. The custom font requester is a major improvement over II's implementation, in which the program would crash if there were too many fonts available. You can use fonts from any directory, and preview fonts in a special window in the requester. The magnify tool lets you zoom in and out on any section of the screen, permitting fine detail work. The grid tool lets you restrict cursor movement to an adjustable rectangular grid for precision work. And symmetry, which is unchanged from II, allows you to create kaleidoscope-like or tiled patterns.

The Magnify and Zoom tools work together to let you work under a variable strength magnifying glass, as it were, for fine tuning images. The Undo tool reverses the effect of your last action,

Paint III

and Clear erases the screen completely. At the bottom of the Toolbox are the Color Indicator and Color Palette for selecting and altering colors. The Color Palette requester, accessed by clicking the right button on the Color Indicator, works much the same as in DPaint II, except there are now six (instead of four) color ranges available for color cycling and graduated fills. You can set palette colors to any of the Amiga's 4096, copy and exchange palette colors, and automatically create spreads from one color to another.

The new Spacing requester allows the current brush to be repeated along paths defined by the straight and curved line and unfilled rectangle, circle, oval, and polygon tools. It offers separate settings for repeating the brush "N total" times or "Every Nth dot", respectively equivalent to II's Relative and Absolute spacing settings, but much more straightforward in description. Also, a new spacing setting lets you paint using the airbrush tool along the specified path—a great way to make fuzzy rectangles!

Many commands, including most Toolbox commands, are available from the standard Intuition menus, accessed either by the Amiga's right mouse button or the keyboard. DPaint users will be relieved to know that Dan has completely redesigned the troublesome file requesters. When you first load or save a file, you are requested to select a device by clicking on one of the buttons showing all available drives, including any hard drive partitions. Since the program does not automatically first obtain a listing of the current directory, you can save time if you need to access a different one.

Other Picture Menu commands familiar to DPaint II users include Page Size, which sets a working page larger than the screen size; Show Page, which reduces an oversized page to fit the screen; and Screen Format, which converts images between the Amiga's different graphic modes, excluding HAM of course. Alas, maximum picture size is still limited by available Chip RAM. And, as before, pressing the J key takes you to a spare painting screen. A new Picture command lets you flip the entire screen horizontally or vertically without picking it up as a brush.

The Brush menu lets you load, save, resize, flip, and otherwise play with custom brushes. One nifty new brush command lets you outline the current brush with any palette color, repeatedly if you wish. Also, you can now position the brush handle in any corner or at any offset from the brush.

The Mode menu retains its wonderful range of painting options including Cycle, Shade, Blend, and Smooth, while adding a couple of new ones. The Tint mode, available only with built-in brushes, replaces the painted area's hue and saturation with that of the current brush's without affecting the value. When employed with an appropriate palette, you can use Tint to recolor carefully shaded areas quickly and easily. And when painting in Extra Halfbrite mode, the Hbrite brush lets you darken or lighten areas of color to their halfbrite or full brightness equivalents—very handy for quick shadow effects.

The Effect menu remains substantially the same, offering commands to let you create stencils, fix the background, and set perspective for painting with custom brushes. Stencil lets you "lock" colors in the drawing, preventing them from being drawn over. You can select the colors to be locked from a palette

(continued)

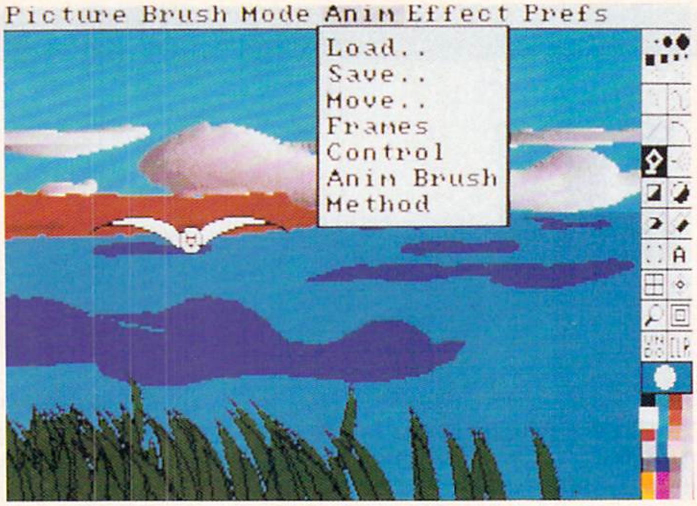
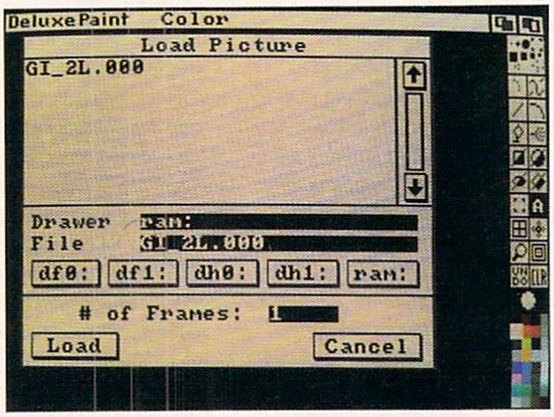


Figure One (top)
"Anim" menu.

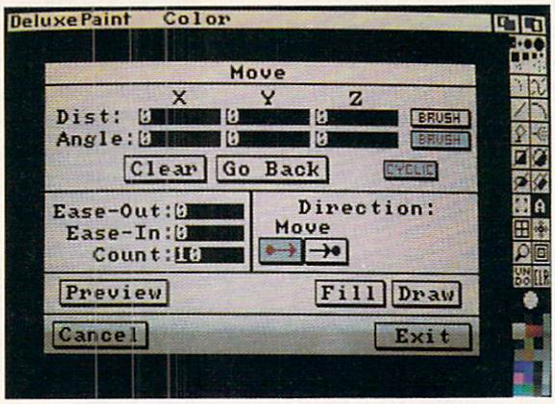


GI_2L.000

Drawer ram:
File GI_2L.000

# of Frames: 1

Figure Two (center)
"Load Picture" requester.



	X	Y	Z
Dist:	0	0	0
Angle:	0	0	0

Ease-Out: 0
Ease-In: 0
Count: 10

Figure Three (bottom)
"Move" requester.

requester or directly from the drawing. Using the Fix Background command effectively sets a fixed undo point. The current drawing becomes the background, so it's restored whenever you clear the screen. And perspective settings are newly expanded, with a special requester all their own.

The Prefs menu lets you "customize" a variety of program settings to suit your working method. Coords shows the current cursor coordinates on the X and Y axes. Fast Feedback speeds up working with complex brushes using the line and unfilled shape tools. Unfortunately, gone is Fast Feedback's "hidden" feature, the ability to draw each line in the next color in the color range when you draw in Cycle mode with the Control key held down. New preference settings include Auto Transparency, which automatically determines the background color from brushes picked up against any color solid background; No Icons, which lets you save files without Workbench icons; and AutoGrid, which lets you choose whether your perspective grid is automatically resized when you select or load a new custom brush.

All this and animation, too

DeluxePaint III is an equally effective animation tool. The most notable change from DPaint II is the new Anim menu, the animation control center. From here you can set the number of frames, compression type, and more. Normally, the program compresses animations, so that only the changed pixels from frame to frame are saved. Thus, with subtle movement, you can have many frames of animation with a minimal memory configuration.

(continued on page 74)

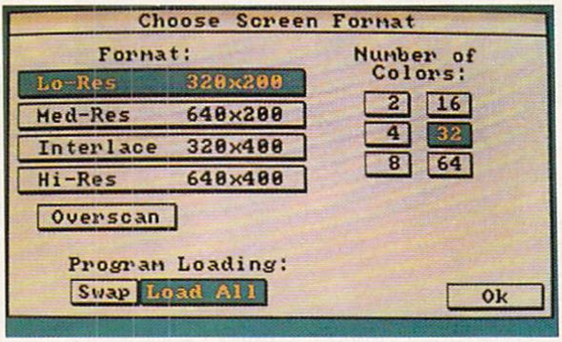


Figure Four (left)
"Choose Screen Format" requester.

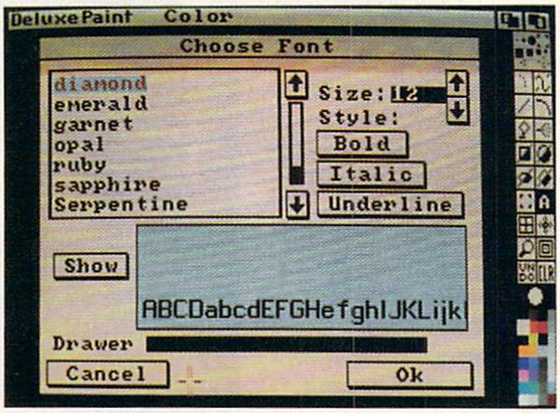


Figure Five (right)
"Choose Font" requester.

New Products

& other neat stuff

by Michael Creeden

Quarterback 3.0 still in locker room, imposter on field

In a rather unusual press release, Central Coast Software announced that **Quarterback 3.0** has **not** been released. Central Coast issued the press release to counter reports concerning a version 3.0 of Quarterback, Central Coast's popular hard disk backup program. Apparently, an illegal copy version is sailing through Amiga pirate bulletin boards. Central Coast has not yet released Quarterback 3.0—in fact, it's not even being worked on.

The current version of Quarterback is version 2.2, released at the end of September 1988. Quaterback backs up hard disks to AmigaDOS-compatible streaming tape, high-density floppy disks, and standard floppy disks. Version 2.3, which is being worked on, will back up to devices that don't have the standard mountlist entry.

For more information, contact Betty Chamberlain at:

Central Coast Software
424 Vista Avenue
Golden Colorado 80401
Tel: (303)526-1030; FAX: (303)526-0520

2nd Forth

Delta Research recently released **JForth 2.0**, a programming language for the Amiga. JForth provides the tools you'll need to write commercial-quality programs. JForth uses an interactive environment to accelerate development, so you can compile simple programs in seconds, and you'll also be able to write programs comparable in speed and size to those written in C. You can call any Amiga subroutine by name; reference structures with size checking like C; use many examples illustrating graphics, Intuition, Devices, and HAM; or use the IFF toolbox, plus simple bitmap animation with Wipes and Fades to get started.

The most significant new feature is Clone, the "Optimizing Target Compiler." Clone examines a compiled Forth application and builds an executable image containing only the code and data needed. The JForth package also includes a manual with tutorial for beginners, Source Level Debugger with single step and breakpoints to reveal program operation, a Command Line history similar to Amiga shell, user-assignable function keys, and numerous examples and sample applications.

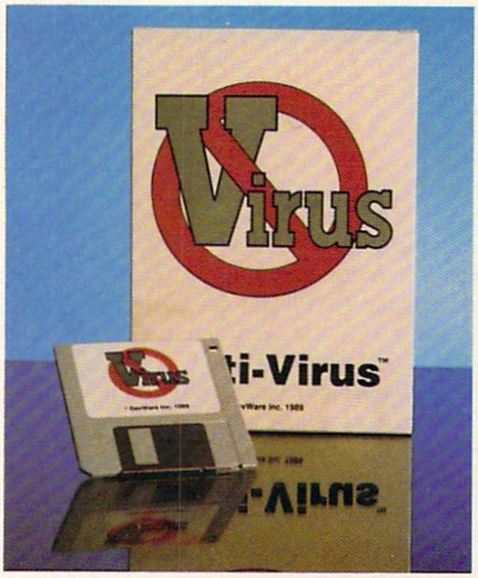
JForth compiles directly to 68000 machine code so it executes 2-3 times faster than traditional Forths. It features floating point support, FFP, and IEEE double; precompiled modules for include files; 32-bit stack, 32 and 64-bit operators; hashed dictionary for fast compilation; object-oriented dialog; and more.

For an example of JForth code, see AC 3.12, p.79.

$179.95
Upgrade from 1.2, $50.00
Delta Research
P.O. Box 1051
San Rafael ,CA 94915

A new kind of self government

Are you tired of living in the same dead, dull, and boring city? Tired of seeing buffons run your hometown when you *know* you could do better job? Fret no more. Now you can run your own city, with Maxis Software's **SimCity, The City Simulator**.



In SimCity, you can be Mayor or City Planner of a simulated city. You'll zone land, balance budgets, install utilities, manipulate economic markets, control crime, traffic and pollution, and overcome natural disasters—you'll control the city.

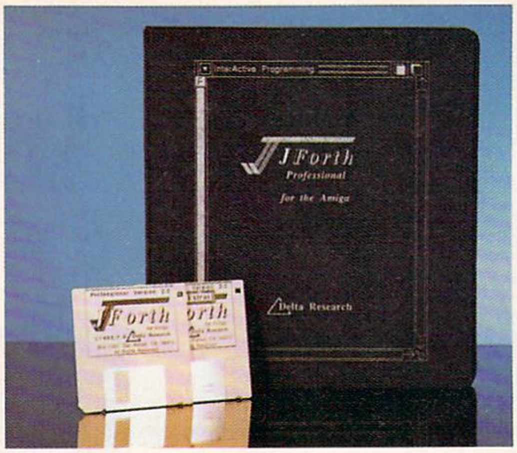
Tired of living in someone else's idea of a city? Don't worry, build your own. In SimCity, you can build your own utopia from the ground up. You can also take over one of several famous burgs verging on disater: San Francisco, CA in 1906, before the earthquake; Tokyo, Japan in 1957, before the monster attack; and Boston, MA in 2010, just before the nuclear meltdown (thanks guys). After the disaster, you'll gather funds and information and try to build the city back up.

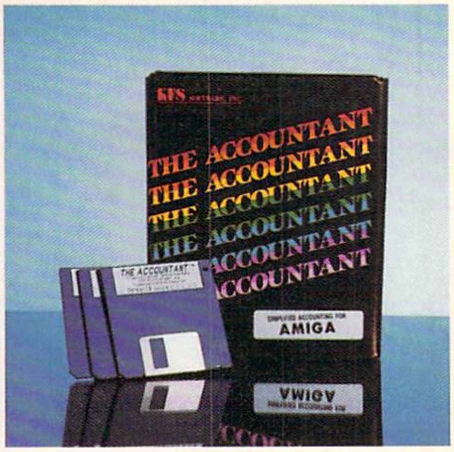
Your SimCity has traffic on the roads, trains on the rails, planes in the air, and football games in the stadiums. As City Planner, you'll watch populations rise and fall; neighborhoods evolve from single-family homes to condos to slums; and commercial and industrial areas succeed or fail according to your planning.

(continued)

JForth (left) uses an interactive environment to accelerate development, so you can compile simple programs in seconds, and you'll also be able to write programs comparable in speed and size to those written in C.

The Accountant 1.3 update covers new types of businesses including manufacturing businesses that need Process Costing, and businesses needing up to 9 Departmentalized Income Statements.





Although you'll be the boss, the denizens of SimCity, the Sims, will do the living and dying. They'll also complain about taxes, traffic, crime, and more taxes. But if you get tired of their incessant complaining, just get rid of 'em. You can play dictator and wipe them out via terrorism or financial disaster; or call up an earthquake or a monster attack.

SimCity. For those who want a more active role in city government.

$44.95
Maxis Software
953 Mountain View Drive, Suite #113
Lafayette, CA 94549
(415) 376-6434

Virus Buster

If you're worried about computer viruses (and who isn't?), DevWare's **Anti-Virus** package of programs provides protection against viruses and trojan horses. And unlike most virus-protection programs, which must know about a certain virus to prevent it, Anti-Virus is guaranteed to stop any Amiga virus, before it inflicts damage.

Anti-Virus comes with a unique visual Anti-Virus bootblock which displays the Anti-Virus logo onscreen every time the Amiga is turned on or warm-booted. The Anti-Virus bootblock occupies the same disk that Amiga viruses do, so if a disk is infected by a virus, the Anti-Virus bootblock will be corrupted and the logo will not be displayed, so the user will know something is awry—before damage is done.

Anti-Virus also comes with vCheck, a program that monitors virus transmission paths. Usually placed in the Amiga startup sequence, vCheck monitors each desk that goes into the Amiga for the presence of a virus and informs the user if a virus is detected. Another utility, vTrojan, protects against trojan horse programs. Anti-Virus also protects game software and copy-protected software.

The package includes a bootblock cataloging program and other status programs.

DevWare, Inc.
10474 Rancho Carmel Drive
San Diego, CA 92128
(619) 673-0759

daVinci meets Disney

The standard-bearer of Amiga paint programs has just raised the standard. Electronic Arts has released **DPaint III**, which does Dpaint II one better by adding animation. DPaint II retains Dpaint II features like split screen with magnify and zoom, 3D perspective, color gradient fills, stencils, and powerful selection, color cycling, and a complete set of paint tools. To the already powerful II package, DPaint III adds AnimPaint, which makes animation as easy as painting.

The Anim Menu lets you create 3D animations; set the number of frames, add, delete, and copy frames; and play the animation forward or backward. The Animbrush works like an animated brush to give DeluxePaint III cell animation capability. You can use the animbrushes to paint a single frame or a series of frames, and you can even paint across a series of frames.

New paint features include extra-halfbrite support for 64 colors, direct overscan support for desktop video, wrap and tint brush for special effects; precision airbrush painting; better font support; anim file format; faster perspective; and much more.

$149.00
Electronic Arts
P.O. Box 7530
San Mateo, CA 94430

Get with the program

Who was I supposed to call today? What was the name of that book I wanted to read? Where is my calendar? When is my next vacation?

If you've ever needed the answers to these questions and a dozen others, Blue Ribbon Bakery has just the thing for you. It's called, of course, **Who! What! Where! When!**, and it works like an electronic secretary.

You were supposed to call Jack something. Or was it Something Jack? No, it was Jackson. Was that his first or last name? Don't worry, just use the search command. Type in "Jack", click search, and you're off. If too many Jacks turn up, narrow your search by typing in a state. With any luck you'll find your man—or was it a woman?

There's more. You can schedule appointments and things to do, then view all your appointments or just those with a certain person. Use the Calendar

(continued)

"It was a dark day.

A day so dark, I needed a flashlight to put my socks on the right feet. My secretary Gladys had quit the day before, walking out with my heart and my Rolodex. I was lost. Then, a mysterious woman walked in...

She had a great software package, the kind of goods you want to take home to Mother. She whispered, *'Who!What!When!Where!'* then handed me the box and exited stage right. I never learned her name, but that woman changed my life.

Now, I use ***Who!What!When!Where!*** to schedule appointments, to remind me of upcoming events, to dial the phone, to print address labels,and as a calendar, alarm clock, and yes, as a Rolodex, too.

Of course, Gladys made better coffee, but then ***Who!What!When!Where!*** doesn't demand profit-sharing..."

Who!
What!
When!
Where!

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BAKERY

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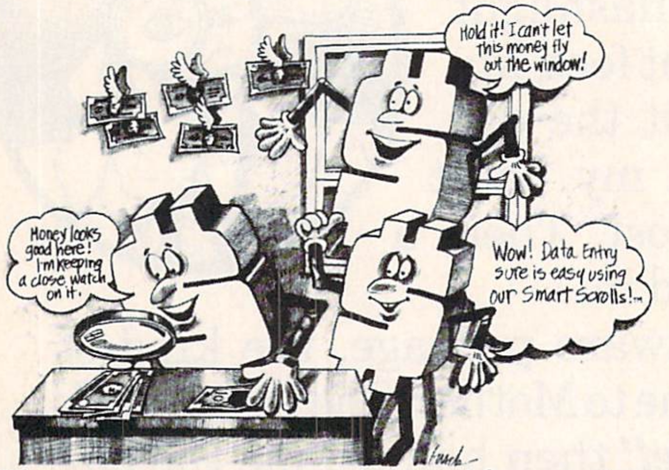

Hold it! I can't let this money fly out the window!
Money looks good here! I'm keeping a close watch on it.
Wow! Data Entry sure is easy using our Smart Scrolls!™

When you want to manage your personal finances, Money Mentor goes a step beyond.

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- Automatic Account Balancing
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to set appointments to repeat daily, weekly, bi-weekly, monthly, or yearly. Use the directory to list friends, family, business associates, enemies, and their phone numbers, addresses. The directory also includes a notepad and the ability to categorize your associates into easy-to-find groups.

Need a reminder? Set the alarm clock, enter what you need to remember, and forget it. The alarm clock will remind you via a bell, voice, sound effect, and/or screen flash. You can print out addresses and phone numbers for your next business trip, or a "fridge list"—one of those reminder sheets that only works when it's taped to your favorite door.

If you still need help, keep a Things to Do List. This one won't let you slide by, though, because if you forget to do something one day, it will just pop up again on the next day's list.

Who! What! Where! When! lets you lock your data with a password or share it with other WWWW users. The application boots up a background timer to make sure you're reminded of important dates.

The best thing about WWWW is that it costs less than a real secretary.

$69.95
Blue Ribbon Bakery
1248 Clairmont Road, Suite 3D
Atlanta, Georgia 30030
(404) 377-01514

Account for your actions

KFS Software recently released version 1.3 of **The Accountant** for the Amiga. The update covers new types of businesses including manufacturing businesses that need Process Costing, and businesses needing up to 9 Departmentalized Income Statements. The update still offers the inventory and point-of-sale options including a complete cash register, point-of-sale invoice writer, an automatic billing section, and a handwritten invoice posting section.

Version 1.3 supplements these features by adding the Process Cost feature, which lets manufacturing concerns post finished goods inventory. The Departmentalized Income Statements allow businesses with up to 9 stores or departments to generate separate statements for each store or department. Other improvements include user-selectable aging for accounts payable and receivable, optional invoice detail saving, and unit sales tracking in inventory. The Accountant lets users print reports to the screen before sending them to the printer, or they can be printed to disk for multitasking with other programs.

The Accountant runs on all Amigas with 1 MB RAM. The package also includes enhanced documenation with 40% more pages. KFS is offering a demo copy of The Accountant for $9.95 prepaid. KFS users who join the KFS Upgrade Club ($24.95 for a lifetime membership) will get future updates for $9.95 per disk. The Accountant 1.3 comes on 1 or 2 disks.

$299.50
KFS Software, Inc.
1301 Seminole BLVD. Suite 113
Largo, FL 34640

•AC•

Unchain Your Amiga

Get Amiga 2000 performance without Amiga 2000 prices.

Now you can add Commodores' A2090 hard disk interface, the A2088 IBM BridgeCard*, Expansion Technologies Flash!Card HD interface, memory expansion, or any other A2000 specific cards to your Amiga 500 or 1000.

By providing two vertical 100 pin slots the ToolBox lets you use Amiga 2000 cards with your A500 or A1000 computer. It also provides you with a power status indicator light, an all metal chassis, and a bus pass-thru so you won't be chained down in the future. With it's flexible design you can choose a model with or without a power supply to match both your needs and your budget. What's more it has Expansion Technologies one year warranty on parts and labor.

Models available:

Model #	Comp.	Power	Dimensions	Power Options	Price
EEC-2510	A500	1 amp @ +5V	$4\frac{5}{8}$ x 6 x $14\frac{3}{4}$	The Brick*	$189.95
EEC-2520	A500	2 amp @ +5V 1 amp @ +12V	$7\frac{1}{4}$ x 6 x $14\frac{3}{4}$	Not required	$259.95
EEC-2110	A1000	None	$4\frac{5}{8}$ x 6 x $14\frac{3}{4}$	1 amp off bus *	$179.95
EEC-2120	A1000	2 amp @ +5V 1 amp @ +12V	$7\frac{1}{4}$ x 6 x $14\frac{3}{4}$	Not required	$259.95

*Call for complete information (no chain mail please).

Now with all these models it's easy to link your A500 or A1000 to the wide variety of A2000 cards available, but if you're having trouble choosing give us a call. We'll be happy to give you more information on the ToolBox or any one of the other great products that Expansion Technologies offers for the Amiga family of computers.

TOOLBOX

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TECHNOLOGIES

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Fremont, CA 94538
415/656-2890

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Framingham, MA 01701
508-875-1238

(***Letters**, continued from page 6*)

Very Puzzled,
Michael Lester
Durand, MI

P.S. It was 4.1's "Industrial Strength Menus", that helped me solve my problem. Thank you.

Dear AC:

I am writing in response to the letter from C.A. Barringer regarding problems with AmigaBASIC when using the BLOCK-IF statement. I also had intermittent problems with the ENDIF- "syntax error" mentioned. It also caused me a lot of "headaches" until I realized it only happened when I inadvertently appended spaces or a <TAB> to the ENDIF statement before hitting <RETURN>. Hence the "highlighting" of the spaces following the ENDIF. (This is a "known" bug of AmigaBASIC and doesn't affect the AC/BASIC Compiler.) Of course, the simplest solution is to ALWAYS hit <RETURN> immediately after the ENDIF statement. My personal solution is to use a REMARK statement immediately after the ENDIF using the optional apostrophe syntax (example ENDIF'). This method is particularly useful after the bug has already occurred—just add the apostrophe (REM) and it should eliminate the error.

Sincerely,

Earl Davis
Marion, OH

Dear AC:

One of the men I work with passed on this clue for Defender of the Crown. You can get 1024 invincible knights for your campaign army and an equal amount for your home army. You also become a truly expert swordsman when raiding or rescuing.

To get the invincible knights, type in "k" simultaneously as you are building the army's soldiers with the left mouse button. Press "continue" and you will find you have been given 1024 knights in each the campaign army and the home army. This sure helps the frustrated "Defender" to win a game now and again.

Rick English's son discovered the trick when his normally bothersome sister was typing as he played the game. She wanted to see a kitty.

Curtis G. Blount
Wasilla, AK

Dear AC,

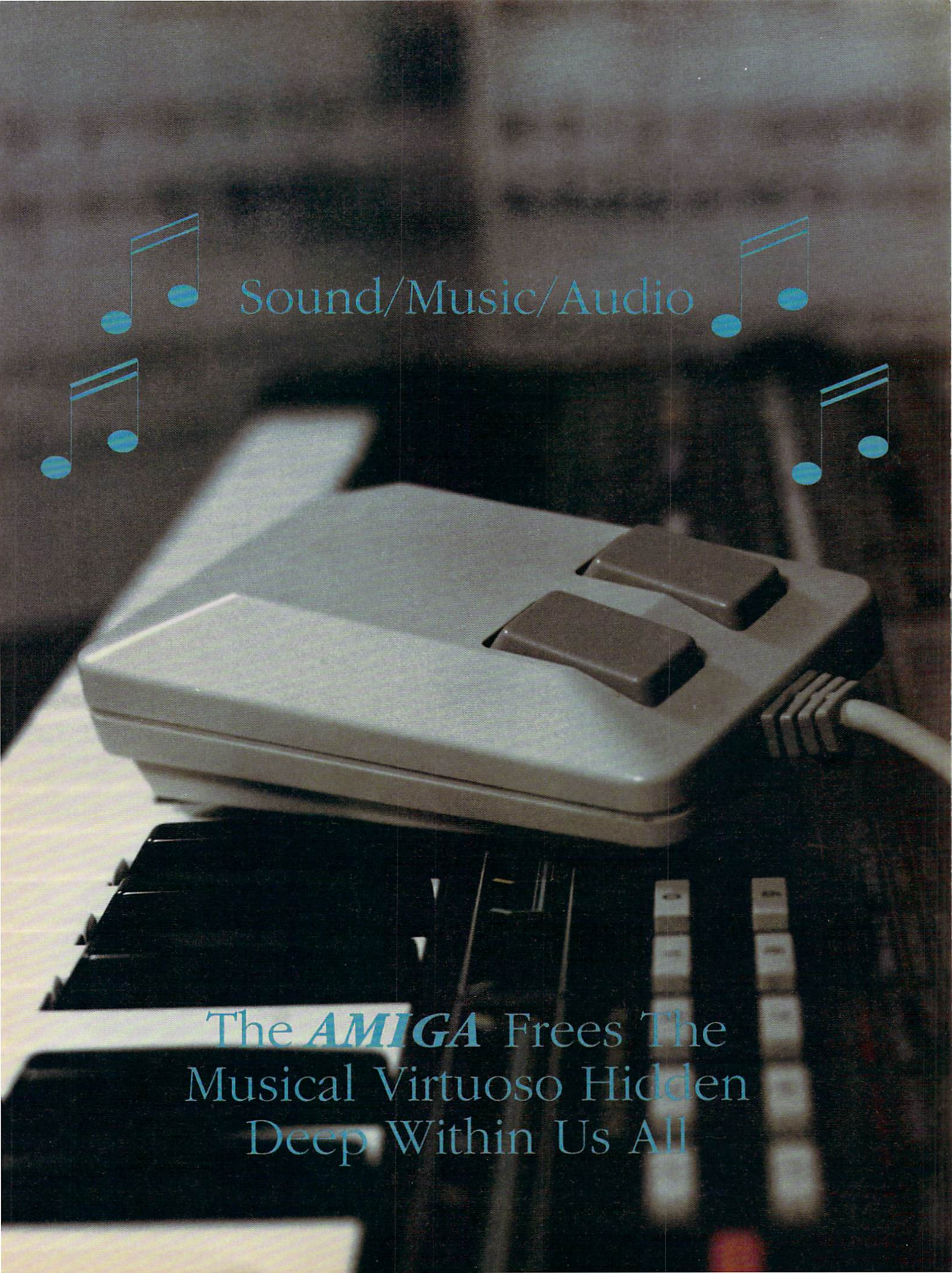
I can't say enough about your January '89 issue. I have just procured an Amiga 1000 with the desire to do animation. I am an artist who has been working with PC compatibles and such for 4 years, and now I have finally arrived...Amazing! I have looked at most of the other Amiga Magazines and not found anything like the "How may I animate Thee?" article. Mr Mortier is wonderful; the articles in January were just what I was looking for. But now I need a lot of new equipment (I would take used!!) to produce the amazing concepts that have been in my head for 4 years. Amazing Computing has a fan for life and Mr. Mortier if you're ever in Washington D.C. stop by!! Please keep the animation information coming. I can't get enough.

Truly yours,

Sandy Triolo
Alexandria, VA

P.S. If there are other sources besides your mag. for animation info, or used equipment please let me know.

Share Your Best
WRITE!
See page 95



Sound/Music/Audio

The *AMIGA* Frees The Musical Virtuoso Hidden Deep Within Us All

AudioMasterII

reviewed by Phil Saunders

> *"Aegis's AudioMasterII is a powerful, yet easy-to-use program for sampling and editing stereo sound on the Amiga.*
>
> *It works with any Amiga sampler, extending the hardware's capability to its limit."*

Aegis's AudioMasterII is a powerful, yet easy-to-use program for sampling and editing stereo sound on the Amiga. It works with any Amiga sampler and pushes the hardware's capability to its limit.

AudioMasterII is an updated version of the original AudioMaster. It adds many powerful features while retaining AudioMaster's ease of use. The limitations of AudioMasterII are imposed by the sampler and the Amiga's hardware design rather than by the program itself. AudioMasterII's most serious defect is that many of its capabilities cannot be used outside the program because they are not supported by the IFF standard. The significance of this problem depends on how the user wishes to use Amiga samples. Despite this limitation, AudioMasterII is the best sample editor available for the Amiga.

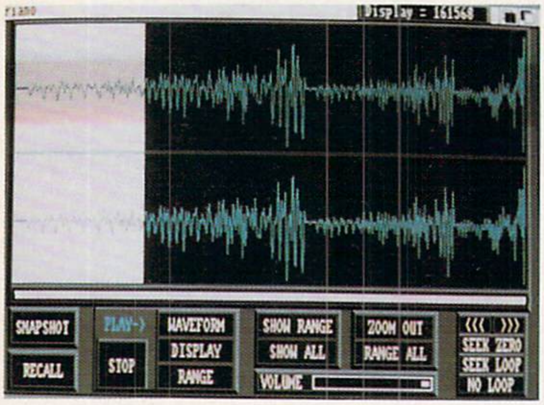


Figure one (above)
AudioMasterII displays a visual representation of the sampled sound (displaying both channels if the sample is in stereo)

A few definitions are in order...

A sampler is a hardware device which converts analog sounds into digital numbers that the Amiga can play back. Samplers hook up either to the Amiga's parallel port (Future Sound and Perfect Sound) or to the joystick port (Mimetics). The most important factors in the quality of a sampled sound are the sample's resolution and sampling rate (the number of samples per second). The Amiga hardware is limited to 8-bit resolution, while professional samplers use 12 or 16 bits. The sampling rate determines the maximum frequency response of the sampled sound. If the sampling rate is not twice as fast as the highest frequency in the sound, unwanted distortion will occur. To record a sample with a frequency response of 15 kilohertz, sampling rate must be at least 30,000.

The speed at which sounds can be sampled with AudioMasterII depends on the sampler and whether the Amiga is equipped with a 68020 processor. Using a standard 68000 and a Future Sound sampler, AudioMasterII can sample at rates of up to 27,965 in stereo and 44,744 in mono. Using a 68020 processor will extend both rates to 55,930—well beyond the audible range for humans. For comparison, consider that a compact disk plays at a rate of about 44,000 stereo samples per second. AudioMasterII can actually play samples faster than a CD player, although other considerations limit the actual sound quality that can be achieved.

The user must set the sampler type and maximum sampling rate before the program can record sounds. I tested AudioMasterII using the Perfect Sound sampler, which supports a maximum rate of 22,372 samples per second. Note that you need a Future Sound sampler to use the highest rates AudioMasterII supports. A number of other parameters can also be set to the user's preferences. The settings are saved in a configuration file that will be loaded the next time AudioMasterII runs. This is a great feature, allowing you to customize AudioMasterII. This customization even extends to the point of allowing the user to turn the warning requestors on or off. Peter Norman, the author of AudioMasterII, deserves credit for making AudioMasterII so user-friendly.

After the settings are loaded, AudioMasterII is ready to go. The sampling screen may be selected with a menu or a command key equivalent (AudioMasterII provides command keys for most important functions). The sampling rate and maximum size must be set before sampling can begin. There

(continued)

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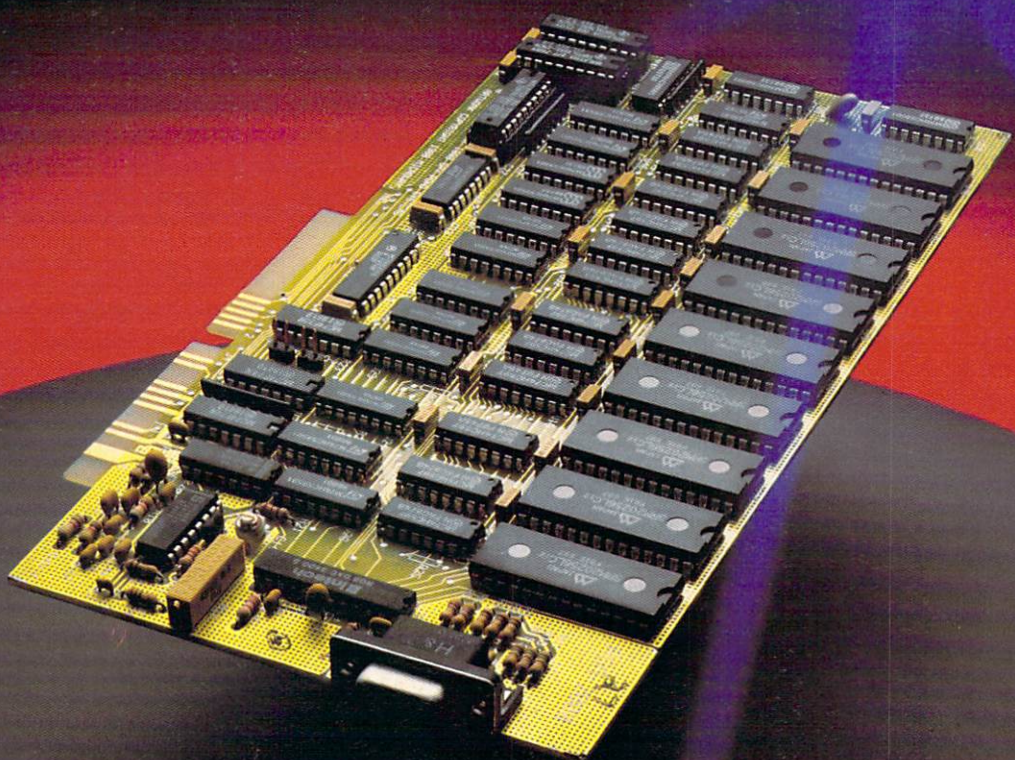

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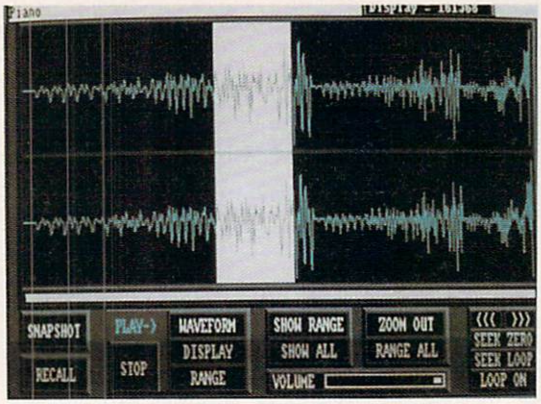
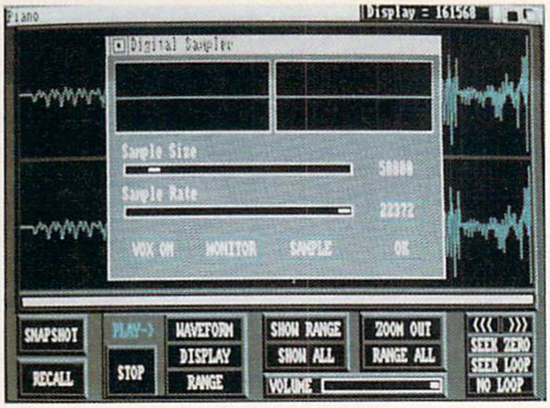
Figure two (left)
AudioMasterII also provides Seek Zero and Seek Loop functions which automatically try to find the best looping points.

Figure three (right)
It is usually best to sample at the highest possible rate and then use AudioMasterII's resampling capability to reduce the size of the sample.





is a trade-off between sample quality and memory usage: the higher the sampling rate, the more memory the final sample will require. Fortunately, AudioMasterII can use expansion RAM to store samples, so sample size is limited only by the largest continuous block of memory available. It is usually best to sample at the highest possible rate and then use AudioMasterII's resampling capability to reduce the size of the sample.

Set the input level of the sampler as high as possible without distortion. The monitor function provides a visual check that allows the user to adjust the volume properly before sampling starts. Once the volume is set, there are two ways to start sampling. SAMPLE will start recording immediately, while VOX will wait until the sample level reaches a preset point before recording. This is ideal for "no hands" recording. Once sampling begins, AudioMasterII takes over the machine, so all disk access must therefore be completed before sampling. AudioMasterII needs all the Amiga's processing power to achieve its high sampling rate. Once the actual sampling is finished, however, the Amiga will resume multitasking.

Once the sound has been captured by the Amiga, the fun begins. AudioMasterII displays a visual representation of the sound, displaying both channels if the sample is in stereo. Scaling gadgets allow the user to select the level of magnification for the display and to scroll from start to end of the sample. AudioMasterII's display system is well thought out and easy-to-use. The default settings show the entire sample, but it is easy to select a range and then expand it to fill the screen. In fact, this is the way most editing works with AudioMasterII: the user selects a portion of the sound and then uses the menus or command keys to select an editing function or a special effect. AudioMasterII allows the standard Cut/Paste/Copy options, as well as a host of special effects. Visual editing makes it very easy to eliminate "dead time" at the beginning or end of a sample. Cut and Paste editing can also be used to create "MMMMMax Headroom"-type effects.

One of the best reasons for using sample editing software is to find good loop points for instrument samples. Loops are sections of a sample that are repeated when a sample is sustained. Bad loops will make a clicking sound each time the loop is played, while good loops can be nearly undetectable.

Selecting loop points is an art, but AudioMasterII makes it much easier. Once the loop function is turned on, the loop points can be adjusted by moving the repeat markers with the mouse. Since the sample can be played while the user is moving the loop points, it is easy to hear the results of each change. AudioMasterII also provides Seek Zero and Seek Loop functions which automatically try to find the best looping points. Often the Seek Loop function will find "false loops" which will play at a higher frequency. Hitting Seek Loop again will reset the repeat marker. Sometimes it is necessary to hit Seek Loop ten times before a satisfactory, clickless loop is found. Nevertheless, the Seek Loop function makes looping much easier. It is a significant addition to AudioMasterII.

One of the problems with the original AudioMaster was that it did not allow looping of large samples (those greater than 131,000 bytes). This limitation was related to the IFF standard (which sets size limits on loops) and the need to have the looping portion of the sample in chip memory. AudioMasterII normally limits looping of large samples to conform with the IFF standard, but allows the user to override this default and set repeat points on any size samples. One useful application for this function is in transcribing music. It is easy to record a guitar solo, then use the repeat function to isolate short phrases and identify which notes are being played. Once these notes are transcribed, the repeat markers can be moved to the next section of the solo without resampling. I find this a significant improvement in the program.

Sound Effects

For most people, the effects section will be the "creative" part of AudioMasterII. The user can play sounds backwards, add echo, add flanging, tune the sample, change the volume, and filter out high frequencies. The edited sound can then be saved as an IFF instrument or sound file suitable for use with other programs. Echo can add either a subtle "slapback" effect or a full-fledged "canyon" echo.

The decay rate and number of echoes are both user-adjustable. It can take up to a minute to calculate and add echo to the sample. If your taste leans more towards "instant gratification," AudioMasterII includes a "real-time" echo mode. With real-time echo, AudioMasterII adds an echo effect to the sampler's input. The original sound is in one channel, the echo effect in the other. The sound is not quite as good as a dedicated effects processor, but it is quite impressive and a great deal of fun nonetheless.

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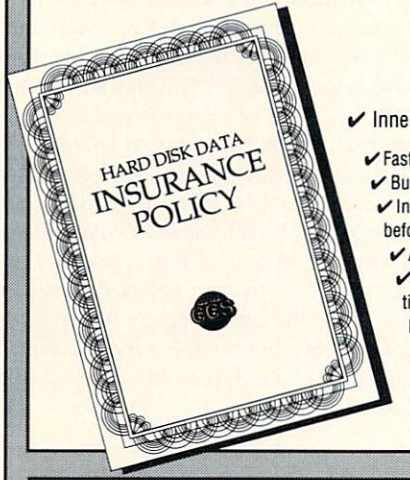

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The Reverse effect simply reverses the selected part of the sample. This is useful for experimentation and for deciphering the backwards sound effects on old Beatles' albums. The Mix Waveforms effect combines the original sample with whatever is stored in the copy buffer. This can be used to either combine two different samples or to add a flanging effect to the sample. AudioMasterII automatically adjusts the sounds to ensure that the mixed sound is not distorted.

Change Volume allows the user to control the volume of a sound. This could be used to boost a soft sample to its maximum volume (although it is always better to record the sound at the highest possible level to maximize the signal to noise ratio). Change Volume will also "ramp" a sample range to create envelope effects. The user can start the range at 25 percent volume and "ramp" up to a full 100 percent, creating a crescendo effect within the sample.

> *"Essentially, AudioMasterII will record and playback the highest quality samples the Amiga's hardware will allow, but these high quality samples cannot be used in other music programs. Nor can stereo samples be used as instruments. This is not a limitation of AudioMasterII, but of the IFF standard."*

Finally, the "high pass" filter effect can be used to eliminate "aliasing" distortion. Aliasing distortion is caused by sampling a high frequency sound at a low frequency rate. The result generates new frequencies which are heard as noise. In practice, the high pass filter reduced the aliasing distortion, but did not eliminate it entirely.

AudioMasterII includes an extensive tuning and resampling section for the creation of IFF instruments. The general theory is that the sampled sound is tuned to middle C and resampled at an IFF compatible rate. Once loop points are selected, the result is saved as an IFF instrument, with AudioMasterII "creating" the octaves above and below the sample. Resampling essentially involves interpolation of data to create a new sample at a lower sampling rate. This saves memory by reducing the size of the sample and allows creation of an instrument compatible with other music programs. The trade-off is that the resampled sound will have a lower frequency response due to its lower sampling rate. Resampling is quite useful for programmers who want to develop sampled sounds, because sounds can be recorded with maximum fidelity (at the highest sampling rate) and then resampled to save memory. The programmer can experiment with different resampling rates to determine the best trade-off between sample size and fidelity.

Unfortunately, users of music programs do not have this flexibility. The IFF standard was based in part on the fact that the Amiga 1000 has an audio output filter which starts eliminating sound frequencies above 5000 hertz. For practical purposes, a stock Amiga 1000 cannot output frequencies above 7000 hertz. Since the sampling rate must be twice the highest frequency, there is little point in sampling at greater than 14,000 samples per second since the Amiga's filter will remove all the high frequencies the higher sampling rate recorded. Thus, the IFF instrument standard does not support rates higher than 15,838 samples per second. On the Amiga 500 and 2000, this filter is software-switchable. If it is turned off, the Amiga can output higher frequency samples. The Amiga 1000 can also be modified to have a switchable output filter. AudioMasterII allows full control of the output filter. (See Amazing Computing Volume 3, Numbers 4 and 5 for more information on the Amiga 1000 modification.)

The Bottom Line

What does all this information about sampling rates and the IFF standard mean in a practical sense? Essentially, AudioMasterII will record and playback the highest quality samples the Amiga's hardware will allow, but these high quality samples cannot be used in other music programs. Nor can stereo samples be used as instruments. This is not a limitation of AudioMasterII, but of the IFF standard. It is important to understand this.

If AudioMasterII's higher sampling rates give you visions of CD-quality samples inside Deluxe Music Construction Set, you must realize this is impossible. You can play these high-quality sounds within AudioMasterII, but you cannot export them to DMCS, Sonix, or Dr. T's Keyboard Controlled Sequencer. This is the key limitation of the program.

I should not be too harsh though. The higher sampling rates of AudioMasterII will improve the sounds of your IFF instruments slightly. The final instrument will be a copy of a higher quality original, which will result in greater detail and sound quality. AudioMasterII can make samples that fully utilize the capacity of the IFF standard (particularly if the Hi-Fi sample option is used). The bottom line is that no Amiga program will allow the user to create better IFF instruments, but the IFF standard does not support all of AudioMasterII's sound quality.

Complaints

I do have a couple of gripes with AudioMasterII. My major complaint is that it creates a five-octave IFF instrument from one sample. Therefore, it is impossible to create multi-sampled sounds like the drumkit found in some Electronic Arts music products (a multi-sampled sound would use a separate sample for each octave, resulting in improved flexibility and sound quality). The technical difficulties in allowing multi-sampled sounds would be considerable, and this feature would be much more difficult to implement (and use) than the rest of AudioMasterII. But multi-sampling would significantly improve the IFF instruments created by AudioMasterII. By creating the upper and lower octaves from one sample, AudioMasterII adds audible distortion, particularly to the lowest octave. True multi-sampling would eliminate this distortion. The Hi-Fi option reduces this distortion somewhat, but does not eliminate it.

The next item has to do with the low-pass software filter. There are no options—the user selects the filter and then applies it to either or both channels. It would be nice to be able to select the frequency at which the filter operates. Still it would be nicer to have a wider range of equalization options. Synthia provides a variety of digital filters. AudioMasterII could do the same.

(continued)

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An editing function which allowed the user to truncate a sample would also be helpful. Currently, it takes two cut operations to remove the "dead space" from a sample. It would be much easier to select the part the user wanted to keep and use a command to eliminate everything else. The option to turn off the warning requestors eliminated a number of the requestors, but not all of them. This was a little frustrating because one of the nice features of the program is the ease with which it may be customized. Finally, the outside of the package does not provide information about the hardware limits of the samplers. This may not be Aegis's responsibility, but I was quite disappointed that my Perfect Sound sampler could not reach the 44,000 samples per second AudioMasterII supports.

I don't want these complaints to overshadow AudioMasterII's strengths. It is by far the best sample editor for the Amiga. It makes sampling, looping, and editing extremely easy. It supplies a wide range of useful effects that can enhance the quality of the final samples. Stereo sampling is so thoroughly integrated into the program that I haven't needed to mention it specifically in this review. Any operation that can be performed on a mono sample can also be performed in stereo, subject only to memory limitations. AudioMasterII also makes it extremely easy to create IFF instruments, and supports both IFF and SONIX formats. The program is easy-to-use, intuitive, multitasks well, and is virtually bugless. AudioMasterII even comes with a good manual (with a full index).

The bottom line comes down to the user's needs. If a developer wants to record sound effects, AudioMasterII is ideal. The resampling function is perfectly suited for making sound effects "fit" in a small amount of memory. It also supports the maximum sound quality of the Amiga and the sampler.

For a user who wants to create IFF instruments, AudioMasterII is also a good choice. I feel it is the best available sound editor for the Amiga, even though it does not support multi-sampling. My main frustration lies in not being able to use AudioMasterII's special abilities (high sampling rate and stereo samples) in other music programs. This limitation is caused more by the IFF standard than by AudioMasterII. While the IFF standard has been a big part of the Amiga's success, perhaps the time has come to extend it so it might handle the capabilities of programs like AudioMasterII.

AudioMasterII is not copyrighted. AudioMasterII costs $99.95 and an upgrade is available to registered owners who send their original disks and $30.00 to Aegis.

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Dynamic Studio

reviewed by Chuck Raudonis

In 1987, New Wave Software released an innovative piece of software called Dynamic Drums. This program turned the Amiga into a fully programmable, multi-pattern drum machine. Dynamic Drums was a great addition to any musician's software collection, allowing them to add a realistic sounding drum machine to a synthesizer. The only problem with Dynamic Drums was that, since your Amiga was tied up running the drum machine, it was unable to operate a sequencer at the same time. Many found this very limiting.

Well, hold on to your drumsticks. New Wave Software has released its "second wave", a new program called Dynamic Studio. Dynamic Studio is a very interesting piece of software. It takes the drum machine from Dynamic Drums, expands its capabilities threefold, and adds on a full function sequencer and one of the easiest-to-use sequence editors I have ever seen. With Dynamic Studio, you have the full drum capabilities of Dynamic Drums PLUS a 16 track sequencer.

Look out, Ginger Baker

Let's start with the new and improved drum machine. The drum machine can load any ten samples at one time, which can be loaded in whatever configuration you wish. Each sample's pitch can be tuned, and the volume of the sample can be adjusted to balance out the sound of the "drumkit". In addition, a second pitch tuning and volume adjustment is supplied to support an accent sound for each drum. Thus, it is possible to get 20 variations of one sound out of the drumkit.

Samples are standard IFF one-shot samples, readily available in the Public Domain. All major Amiga sound samplers support this format, so it is possible to sample anything and use it as a drum. New Wave supplies over 200 samples with the package.

Each drum can be set to either the primary sound, or to randomly pick a value between the two settings. If the two tunings are only slightly different and the random setting is on, the drum machine will produce a much more realistic sound than standard drum machines not equipped with this flexibility. With the random feature on, such identifiable sounds as the cymbals and the snare drum are not reduced to a monotonous drone. Since real drummers are not robots, hitting each beat exactly the same, drums programmed in this manner are amazingly realistic, as they sound different with each beat.

In addition to controlling the internal drum voices, the drum machine can also control an external drum device. The internal sounds can be layered with, and supplemented by, the drum voices from the external device.

The pattern editor

The heart of the drum machine is the pattern editor. The pattern editor allows you to string these ten samples into drum patterns, 20 of which can be recorded for each song. If the song you are working on has a different drum pattern for the main melody, the bridge, the chorus, and the coda, this program will accommodate you. With 20 patterns to play with, you can copy a single pattern several times and make minor changes to it. Again, this will add a more realistic sound to the drum part. And like a real drummer, who keeps a drum part moving through the use of fills on the cymbals and toms, you can incorporate your own fills using variations of the 20 different drum patterns.

Creating patterns

Patterns can be produced in two ways. First, the pattern can be recorded in real time by putting the pattern editor

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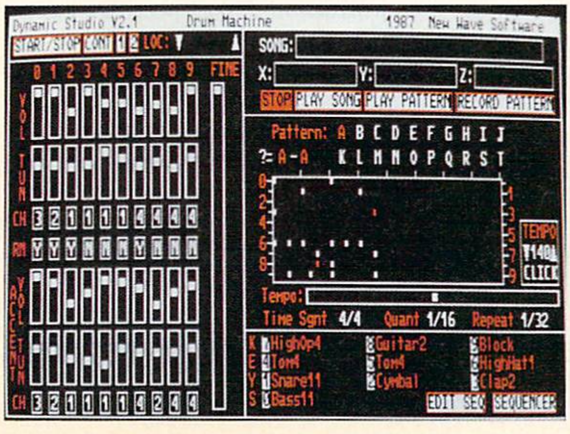

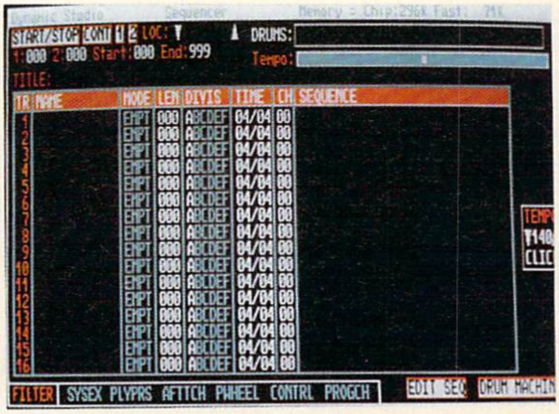

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TITLE:

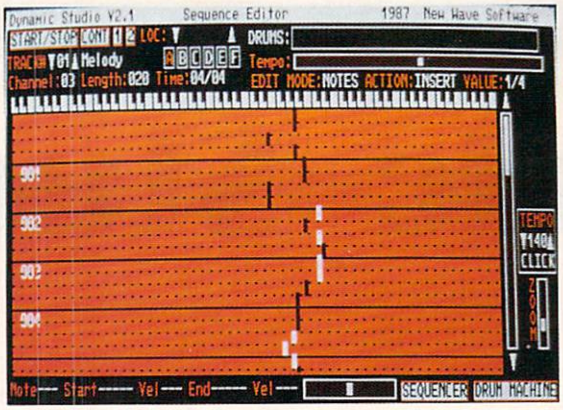
TR	NAME	MODE	LEN	DIVIS	TIME	CH	SEQUENCE
1		EMPT	000	ABCDEF	04/04	00	
2		EMPT	000	ABCDEF	04/04	00	
3		EMPT	000	ABCDEF	04/04	00	
4		EMPT	000	ABCDEF	04/04	00	
5		EMPT	000	ABCDEF	04/04	00	
6		EMPT	000	ABCDEF	04/04	00	
7		EMPT	000	ABCDEF	04/04	00	
8		EMPT	000	ABCDEF	04/04	00	
9		EMPT	000	ABCDEF	04/04	00	
10		EMPT	000	ABCDEF	04/04	00	
11		EMPT	000	ABCDEF	04/04	00	
12		EMPT	000	ABCDEF	04/04	00	
13		EMPT	000	ABCDEF	04/04	00	
14		EMPT	000	ABCDEF	04/04	00	
15		EMPT	000	ABCDEF	04/04	00	
16		EMPT	000	ABCDEF	04/04	00	

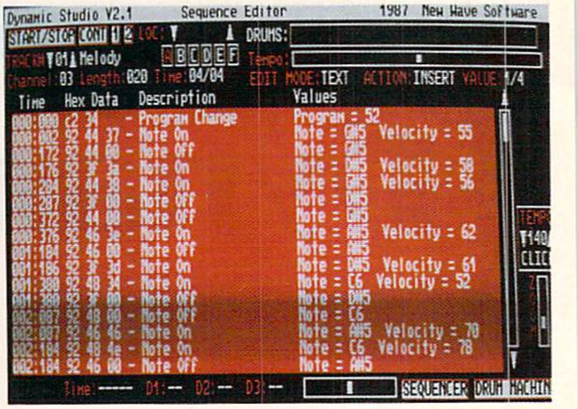
Figure One (left) *The drum machine can load any ten samples at one time, which can be loaded in whatever configuration you wish.*

Figure Two (right) *The sequencer has punch in/punch out capability, so changing a track on-the-fly is easy.*

Figure Three (left)
Dynamic Studio has a very powerful, graph-like sequence editor.

Figure Two (right)
The sequence editor also includes a text-based mode in addition to the graphic interface.





```
Dynamic Studio V2.1          Sequence Editor          1987  New Wave Software
TRACK 01 Melody
Channel:03 Length:020 Time:04/04    EDIT MODE:TEXT  ACTION:INSERT  VALUE:1/4
 Time   Hex Data   Description            Values
000:000 c2 34    - Program Change         Program = 52
000:002 92 44 37 - Note On                Note = G#5  Velocity = 55
000:172 92 44 00 - Note Off               Note = G#5
000:176 92 3f 3a - Note On                Note = D#5  Velocity = 58
000:204 92 44 38 - Note On                Note = G#5  Velocity = 56
000:287 92 3f 00 - Note Off               Note = D#5
000:372 92 44 00 - Note Off               Note = G#5
000:376 92 46 3e - Note On                Note = A#5  Velocity = 62
001:184 92 46 00 - Note Off               Note = A#5
001:186 92 3f 3d - Note On                Note = D#5  Velocity = 61
001:380 92 48 34 - Note On                Note = C6  Velocity = 52
001:380 92 3f 00 - Note Off               Note = D#5
002:087 92 48 00 - Note Off               Note = C6
002:087 92 46 46 - Note On                Note = A#5  Velocity = 70
002:184 92 48 4e - Note On                Note = C6  Velocity = 78
002:184 92 46 00 - Note Off               Note = A#5
      Time:----  D1:--  D2:--  D3:--
```

in record mode, then tapping out the drum part on the numeric keypad or an attached MIDI keyboard. The pattern editor also provides a graphic "player piano" style window that allows you to build the drum pattern with the mouse by pointing to the location for a specific drum beat, and then clicking the button. Once you have the patterns designed and recorded into the machine, it is time to build a drum "song". Each pattern you create is assigned a letter from A to T. When building the song, you must tell the drum machine how many times you want each pattern played, and in what sequence. If you were programming a song that had a twelve-measure verse, a six-measure chorus, and a twelve-measure second verse, followed by the chorus and a two-measure coda, each of these elements would have its own drum pattern as follows: Verse: Pattern A, Chorus: Pattern B, Coda: Pattern C. The song for this piece of music would be programmed as 12A6B12A2C. That's all there is to it! The piece is now complete and ready to have music layered over it via the sequencer.

> *The sequencer in Dynamic Studio is similar to most sequencer packages on the market— that is, until you take a good look at the sequencer screen. Its 16 tracks can be recorded and played back individually. Dynamic Studio is unique in that it allows you to record up to six divisions for each track.*

Tight as a drummer

The sequencer in Dynamic Studio is similar to most sequencer packages on the market— that is, until you take a good look at the sequencer screen. Its 16 tracks can be recorded and played back individually. While most available packages are equipped with this feature, Dynamic Studio is unique in that it allows you to record up to six divisions for each track. The divisions are then used like the drum patterns in the above drum piece. You simply record the main melody on one division, the chorus on another division, and the coda on a third. Then assemble just like you did the drum song. This allows incredible flexibility in laying down tracks. If you are composing a new song, and you want to hear how different passages sound in various mixes, this feature allows you to change the arrangement instantly.

The sequencer

The sequencer has punch in/punch out capability, so changing a track on-the-fly is easy. The sequencer has a built-in metronome, giving you a steady click track while you are recording. If you choose to use your drum song as a rhythm base, the metronome can be silenced.

Dynamic Studio keeps track of the current location in a score by utilizing the measure number and the fractional portion of the measure that has elapsed. Dynamic Studio breaks each measure into 1/384 of a beat. This allows flexibility in putting a note or a drum beat exactly where you want it. If you want a really tight rhythm or a well-tempered song, the sequencer and the drum machine can be set to quantize the notes at any interval you wish. If the quantization is set to 1/8th notes, all notes will be forced to the nearest eigth note beat. This feature can make even the sloppiest player create a tight piece of music.

Cutting tracks

Once you have your tracks laid down into the sequencer, Dynamic Studio's real power takes over. The program has a very powerful sequence editor. The editor allows you to take the recorded sequences, clean them up, and enhance them.

The editor has two modes. The first mode is a graphs mode where the music is displayed on something resembling a player piano scroll. Across the top of the screen is a piano keyboard. As a note is to be played, a line appears under the appropriate key on the keyboard. This display can be zoomed in or out, allowing you to concentrate on one measure in detail, or view the whole song at a macro level. The data can be edited, with the lines being adjusted to reflect the new values entered. Also, if you just HAVE to see the MIDI control bytes and data bytes, and all of the note on and note off events, Dynamic Studio provides a text-based mode in addition to the graphic interface.

The sequence editor allows you to cut & paste, erase, copy, and merge tracks. It also lets you filter the controller values out of a track completely, or just thin them out to keep the effect of the controller. A thinned-out controller will save RAM, since there are not as many control bytes. You can also remap

(continued)

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controllers. If your synthesizer has only a modulation wheel, but a sound module you are triggering accepts a breath controller, record the track using the modulation wheel, then translate all the modulation control bytes into a breath controller. The editor also lets you transpose tracks up or down, and add program change signals.

You can also change the velocity of the notes on the tracks using the sequence editor. If your synth does not have a touch-sensitive keyboard, this option can be used to impart some dynamics to your playing. Sections can be made louder or softer. One of the nicer options in the editor is the ability to randomly (within user-definable limits) set the velocity. Since a keyboard player, like a drummer, rarely hits all notes at exactly the same velocity, this option makes the resulting song just a little (or a lot) more random in volume from note to note, giving a sense of realism not possible with a non-touch-sensitive keyboard.

Heavy synths

Do you want a nice "fat" sound for your lead synth part? Record the part as you want it to appear in the final mix, then copy it to another track. Add a random velocity scale to the original part, transpose the copied part up one octave, and random scale it. Then delete 10 or 15 384ths from the transposed track, and merge the two. The resulting sound is like two synths chasing each other with the lead melody out in front. Pretty powerful stuff.

The editor also allows you to rechannel tracks. You can even rechannel a given zone of the keyboard into an alternate channel. If you want to transfer the lower two octaves to channel four, where you have configured a mellow bass sound, just define it, and the program will respond accordingly.

Optional features

All the features mentioned above are included with the package right off the shelf. One optional feature is a package entitled Oasis. Oasis allows you to take samples created by an Ensoniq Mirage sampling keyboard and convert them into either a format that Dynamic Studio can play, or into IFF format for use in any Amiga music program that accepts IFF instruments.

The Ensoniq Mirage is probably the most popular sampling keyboard on the market, with thousands of different samples available. The Mirage Users Group in New York lists over 300 samples in their library. This program will take these samples and convert them faithfully. Up to four channels can be assigned to the Oasis processor during playback.

One drawback of using the Oasis processor is that any channels being utilized for the samples are not available for the drum machine. This might be a problem if your drum part is very complex, with a majority of the drum samples being utilized. Competition between channels can chop some drum sounds short. However, after a while it becomes easy to predict the effects of this competition and to adjust the channel assignments accordingly.

Missed beats

One negative aspect of Dynamic Studio is that it plays only Oasis sounds. It cannot load and play IFF instruments. However, the author has assured me that a soon-to-be-available enhancement will correct this deficiency. New Wave has stated that all registered users will be notified of the update, so register that software!

All in all, Dynamic Studio is an excellent program that any serious MIDI musician should have a look at. The folks at New Wave are also very helpful in working with you and resolving any questions that you may have.

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•AC•

Building the Amazing
STEREO AUDIO DIGITIZER

by Andre Theberge

Overview

You are probably familiar with the Amiga's amazing audio capabilities. You may have heard the soundtrack of some demo disk at your local Amiga dealer and wondered how to get quality sound from the machine. Well, the sound you heard was probably captured from an external audio source and converted into computer data through a hardware device called a digitizer. A few companies already manufacture such devices for the Amiga. However, I have found them to be either lacking in sound quality, or providing no microphone input, thus making it difficult to record a live subject.

This article covers the construction and operation of a stereo audio digitizer, with both microphone and normal audio inputs. The digitizer interfaces with your Amiga through the parallel port and works with any Amiga if you provide the right connector. It operates with commercially available software, like AudioMaster and Perfect Sound. The latter is available through shareware on your local BBS or on Mr. Fish's disk collection. The Amazing Audio Digitizer features an excellent frequency response (1 to 25 kHz sampling rate) and a sound design better than some commercially available digitizers. You can build your prototype in less than one evening, and the complete project should cost you between $60 and $70, complete with case and power supply. You can build a mono version for even less. Those with a well furnished "junk box" already have most of the parts.

To make it easy for those readers with little experience with hardware projects, I will focus mainly on construction and testing. If you follow my guidelines, you should have no problems making your unit work the first time around. Also, to make your life simpler, I have provided a PCB layout so advanced builders can make their own PCB.

> *The Amazing Audio Digitizer features an excellent frequency response (1 to 25 kHz sampling rate) and a sound design better than some commercially available digitizers. You can build your prototype in less than one evening, and the complete project should cost you between $60 and $70, complete with case and power supply.*

Analog meets digital

This section will explain the process of converting an audio signal into computer data your Amiga understands. As you might already know, data and information in the electronic world can exist in two forms, digital and analog. Digital signals (like computer data) differ from analog ones (audio) as they exhibit a discrete rather than continuous behavior. In plain English, this means you can represent digital data by fixed numbers—like integer variables in BASIC. Analog signals are like real variables—they are not limited to fixed values but can take any value in between. Analog signals can be carried on a single wire, while digital signals usually require multiple wires to carry each bit of information. In the digital world, more wires or bits mean higher transmission rates and better resolution. Higher costs are also involved.

As mentioned earlier, we will be using the Amiga's parallel port to connect our unit. Since it uses 8 wires to carry out digital data, our goal is to convert the myriad of analog values into 256 fixed digital ones. The 256 is actually 2 to the eighth power (2^8), the number of digital combinations available on an 8-bit port.

Now we must translate analog signals to the digital world. We can do this with the help of an Analog-to-Digital

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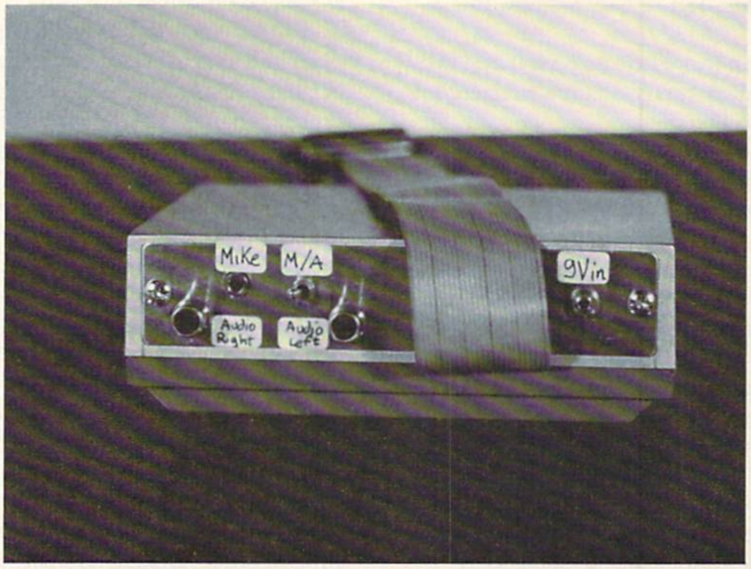

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Converter, or ADC for short. This electronic circuit takes a snapshot (sample) of the analog data and outputs a digital number between 0 and 255 (for an 8-bit converter) representing the value just sampled. By storing these numbers in a computer memory and taking samples at regular intervals, we can have a faithful reproduction of an analog waveform. Figure 1 shows how this is done.

But for practical applications, we must satisfy two conditions inherent in the sampling theory. First, we must be able to sample at least twice as fast as the highest frequency component of the waveform fed into the ADC. This means that if we want to sample a sound which has harmonics up to 10 kHz, the sampling frequency must be at least 20 kHz, or one sample every 50 microseconds. Second, the input signal to the ADC must be stable while a conversion is being done.

For example, if we want to translate a one-volt peak-to-peak waveform into 256 digital levels (a 8-bit conversion) at a rate of 20 kHz, or 50 uSec, we must stabilize the input so it will not change more than 1/256 volts for a 50 uSec period. A Sample and Hold, or S/H, will perform this task in our application.

If we did not follow these guidelines and sampled at a frequency lower than expected, we would get aliasing distortion. This will impair the quality of digital reproduction of the audio signal and will be heard as a "hissing sound" over high frequency material (higher pitch instruments like trumpet and cymbals). Without a Sample and Hold function, the recorded material will contain quantitizing errors that will also impair high frequency contents.

The point to remember here is that high pitch sounds are more likely to suffer from a poorly designed sound digitizer than low frequency ones. In our design, we overcome these problems by using a S/H and a fast ADC. But it is important to know about hissing when you choose a sampling rate. If the sound has too much hiss, raising the sampling frequency will often cure the problem.

That's about it for the theory behind sound sampling. If you feel I have not been explicit enough, or you want more information, you can consult books on Sampling Techniques or refer to magazine articles on the subject.

How it works

We will now cover the design of the Amazing Audio Digitizer. Please refer to Table One and Figure Two for the parts list and schematics. Because it is a stereo unit, a good portion of the circuit repeats itself for the left and right channel. Parts references will be made for the left channel only. For right channel parts, just add 100 (i.e., U2 becomes U102, and so on).

At the heart of the circuit, we find an ADC0844N analog-to-digital converter (U5). This IC is manufactured by National Semiconductor, which carries a full line of ADC. By choosing the ADC0844N, we make a good compromise between conversion speed (40 uSec) and price. This ADC also boasts an on-chip clock and 5-volt operation, which simplifies the design. U5 is connected to the data lines of the parallel port (Pins 2 to 9 on J2). The strobe line of the parallel port (Pin 1) controls the read and write operation (to start a conversion). Read is generated to U1 with the help of an invertor made by U3C, an analog switch. Finally, Pins 13 and 12 of J2 control the chip select for each converter. This configuration enables the digitizer to work with AudioMaster and Perfect Sound, and seems to be a standard for the Amiga digitizers.

The combination of U3A, U2B, and C3 perform the sample and hold function. U2 is a high-impedance operational amplifier which works on a single 5-volt supply. When the analog switch U3 is open, current flows and charges C3 (sample mode) until its voltage matches the amplitude of the audio input. When U3 is closed, this voltage is held (stabilized) so the ADC can perform the conversion.

U2A is an amplifier with a variable gain. It raises the low level audio signal up to 10 times its original value, providing enough signal to the ADC. Potentiometer P1 controls the gain or volume. R5 and C2 filter high frequency contents above 12 kHz, which reduces aliasing distortion. Audio input is fed through C1, which blocks any DC offset from U2A. The user can select from normal audio input or microphone input with the help of S1. Mike input has an extra amplifier

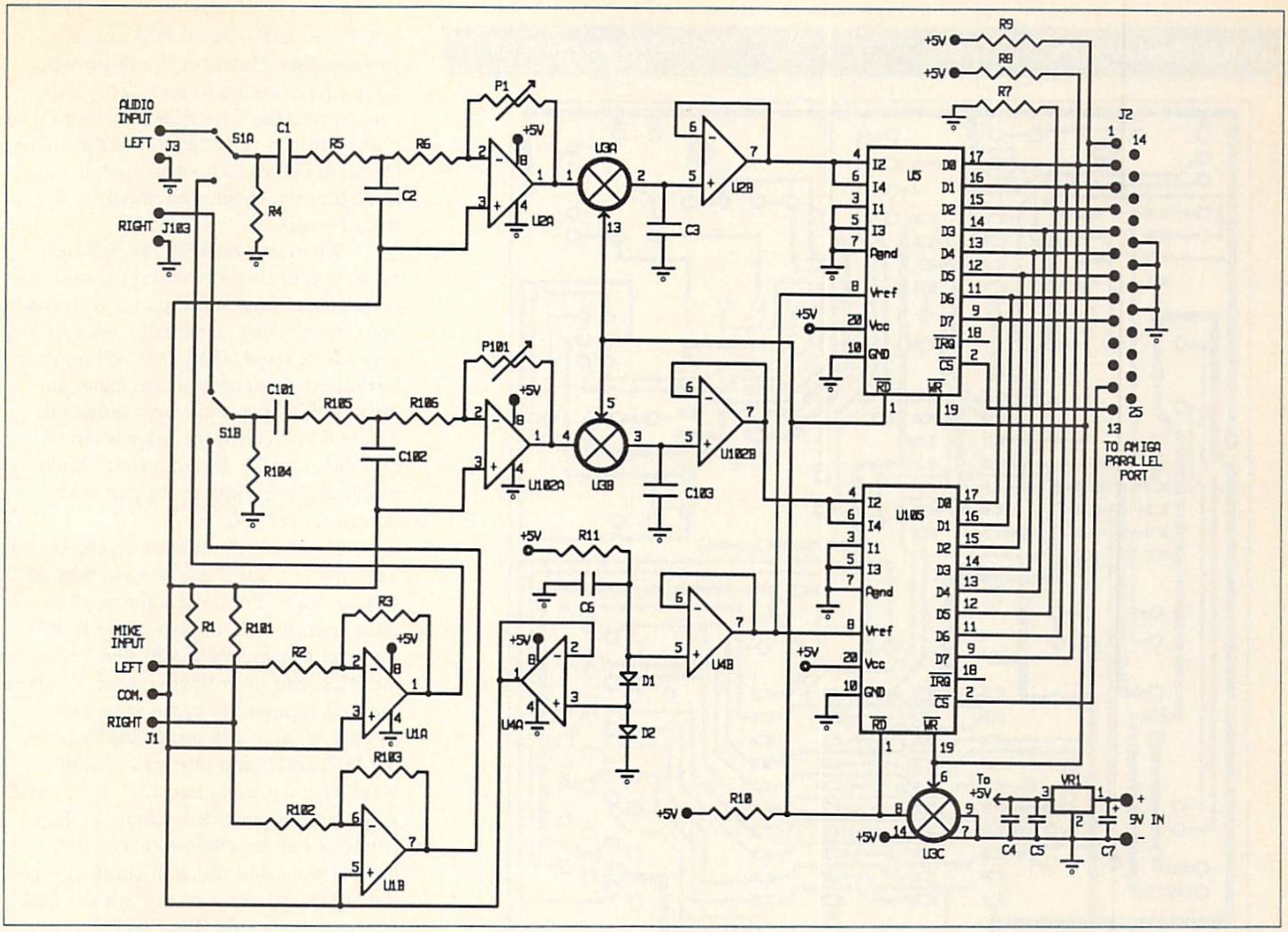


Figure Two *(above)*
Schematic diagram for the Amazing Stereo Audio Digitizer.

with a gain of 100, made with U1A and resistors R1 to R3.

The rest of the circuit is self-explanatory. The whole project works on 5 volts, thanks to the designers of the TLC272 op-amp. However, we cannot use the 5-volt line available on Pin 14 of J2 (or Pin 23, for you A1000 owners) because I found that this supply is not filtered well enough for this application. After several tries to eliminate spikes and low-frequency fluctuations on the 5-volt line, I decided, for the sake of hi-fidelity, to use an external power supply.

This has two advantages over having the unit powered by the Amiga. First, the board will work with every Amiga, thus simplifying the connection to different machines. Second, since you are not relying on your valuable computer to power the unit, you minimize the risk of blowing up your machine should you make an error in the wiring. I do not want to scare you by this, but the possibility does exist. We will use a small 9-volt wall transformer or a 9-volt battery to power the unit and step it down to 5 volts by a regulator (VR1).

Building and testing the unit

You have your choice here; you can either build the audio digitizer using wire-wrap sockets and a net-list, or go the easy way and use a printed circuit board (PCB). I will comment on the second option, since it adds a "professional touch" to the project. I have supplied a PCB layout for your convenience (Figure 3). If you or someone in your area can reproduce it on a copper

(continued)

Figure One *(below)*
Sampling an analog waveform at a fixed rate

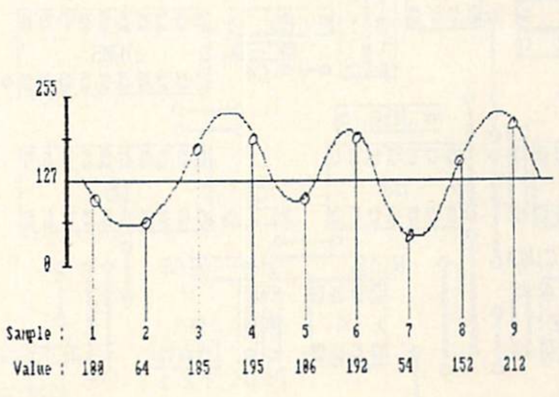


Figure Three— PCB Layout

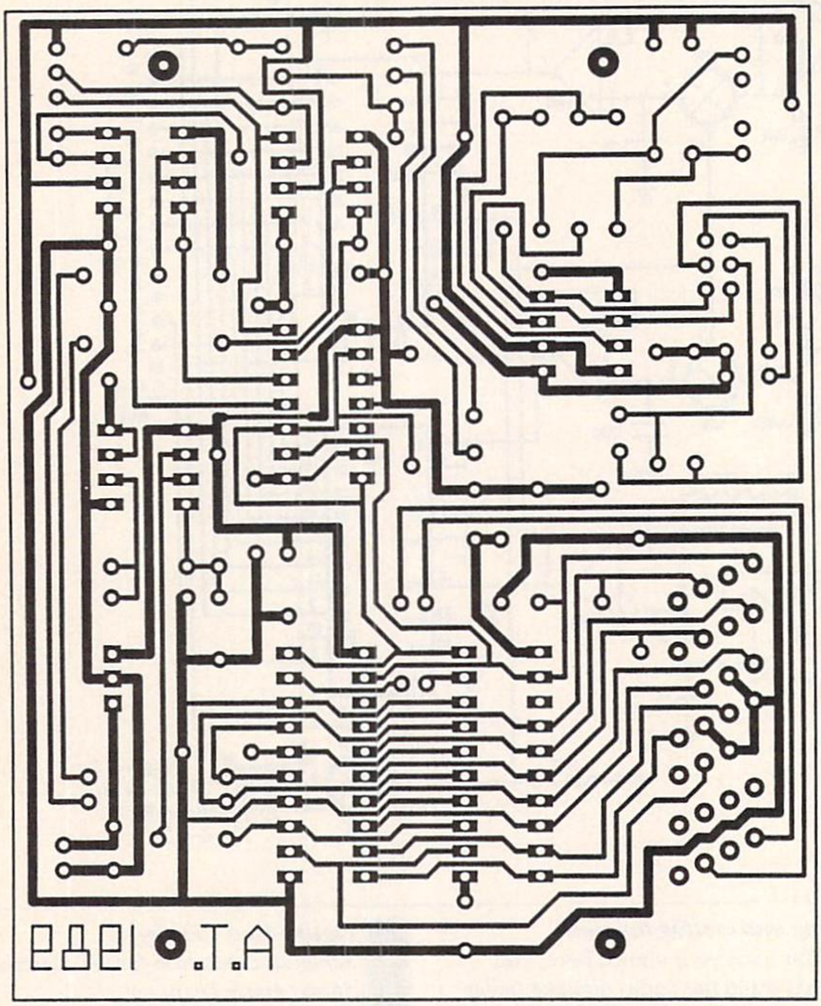
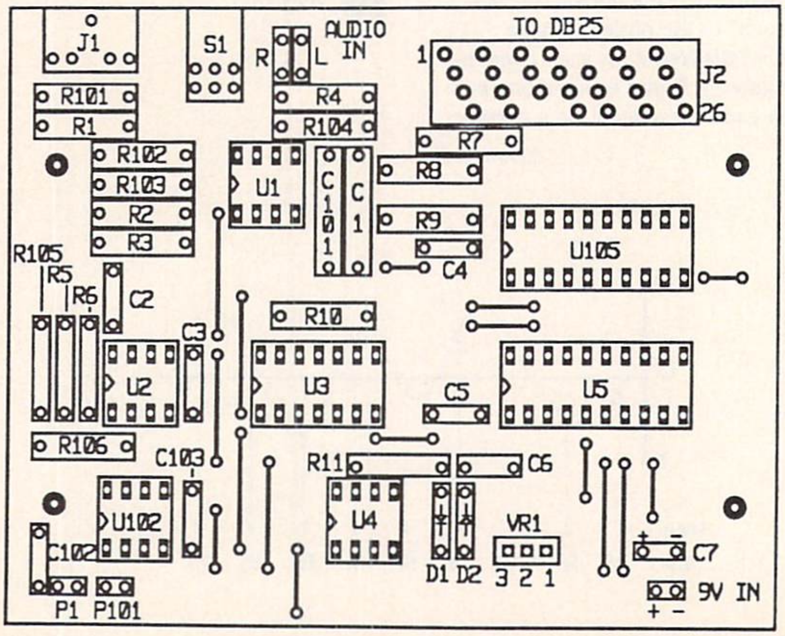


Figure Four— Component Placement Guide



clad board and make a PCB out of it, you're all set. However, for those who do not have access to such facilities, I can provide the bare PCB for $15.00 (US) plus shipping. (See the end of the article for more details.) This will enable you to build the unit faster, and minimize the risk of errors.

When you have all the required parts, you can start building the unit. Use only a small tip soldering iron with rosin core solder. Also, use quality sockets for every IC (except VR1). This will make testing the unit easier if you make an error. Follow the placement guide on Figure 4 and check the orientation of D1, D2, VR1, and C7. If you want to build a mono digitizer, omit every part with numbers over 100.

There are 16 jumpers on the board. You may use small gauge solid wire or resistor leads. Put these jumpers, like any other component, on top of the PCB. Connect potentiometers P1 and P101 to the PCB with short flexible wire. Connect the RCA input jacks in the same fashion, as well as the 9-volt input. Solder J2 on the PCB and crimp one end of a 26 conductor flat cable into J2 (I use a small vise for this operation). Crimp a DB25 connector at the other end. You will have to get rid of the 26th conductor at the DB25 end. Be sure to align the DB25 connector properly (Pin 1 to Pin 1) and use the right gender (male for A500 and A2000, female for A1000). If flat cable connectors are too expensive for you, use flexible wire to connect your DB25 to the PCB. Figure 5 gives you a wiring diagram. When you have finished soldering all the parts, check the PCB for cold solder joints or bridges between tracks. Double check around J2, U105, and U5 especially, since these parts connect directly to your Amiga.

You are now ready to test your prototype. Do not plug your unit into the Amiga yet; we will do that later. With every IC socket empty, put a 9-volt supply to the board. Then check for 5 volts on every IC socket. You should read 5 volts between Pins 4 and 8 on U1, U2, U102, and U4. You should get the same reading between Pins 7 and 14 of U3 and Pins 10 and 20 of U5 and U105. If you get any reading outside a 10% range, check VR1 and the 9-volt input. A common cause for not having 5 volts is that VR1 is plugged in backwards. Pin 1 is to your left when you look at the IC number.

When everything is OK, disconnect the 9-volt source and get rid of static electricity in your body by touching the grounding screw on an electrical outlet or a water pipe. You may now insert the IC's into their sockets. Be careful not to bend any pins or plug them in backwards. Every IC is sensitive to static electricity, so take every necessary precaution while handling them.

With your Amiga turned off, you may now plug the digitizer into the parallel port. NEVER connect or disconnect the unit when Amiga power is on. Turn on your Amiga, then the digitizer and boot up your sampling software. If you have not been greeted by a blank screen or a visit from the Guru, you are in business.

Select the monitor digitizer from the sampling (digitize) menu and watch the signal level. With no audio signal fed to the digitizer, the monitor mode should give a reading of 120-138 on Perfect Sound, or a horizontal bar in the middle of the sampling window on AudioMaster. If you get a reading out of this range, check the voltage at Pins 8 and 4 of U5 and U105. You should read around 1.3 volts and 0.65 volt respectively, on both chips. Lack of voltage would indicate an error around U4, D1, D2, and R11. A common mistake is soldering D1 or D2 backwards.

If you get the right voltage, the trouble is closer to U2 and U102. Check again for 5 volts on each chip and your solder job. Also check the PCB for broken tracks. If you cannot find anything wrong with your work, ask a friend to have a look at it (especially a technically oriented friend). He may find something you overlooked. If you have done everything you possibly can, you can write or call me. However, I can only help those who built their prototype from a PCB, because wire-wrap prototypes can be different from one person to another and are more susceptible to wiring errors.

If you monitor the right level, you can feed an audio source into the digitizer through the RCA jacks. The playback outputs (Tape monitor, PLAY) from a sound system or a VCR will do. If you only have a mono signal, you should plug it into the digitizer's left input. Put the select switch (S1) in the AUDIO IN position. Set volume controls P1 and P101 to their mid-position. If you are still in the monitor mode, you will be hearing your audio signal through the Amiga monitor.

Now try to record a sample. With Perfect Sound, you select "Record a Sample" from the Digitize menu. With AudioMaster, you click twice in the "SAMPLE HI" or "SAMPLE LO" gadgets. After recording, you can play back your sample and check for distortion or noise. If you get a hissing noise over high frequencies, try sampling at a higher rate. You may want to test the microphone input. Plug a low-impedance mike (I use a small tape recorder mike from Radio Shack, catalog no. 33-1054) into J1. Set S1 to MIKE IN and talk 2 to 3 inches from the microphone element. Adjust the volume to get a good signal within the upper and lower limits of the sampling window (AudioMaster) or between 0 and 255 (Perfect Sound).

Eventually, you will want to put your prototype in a suitable enclosure. I used a Radio Shack box (cat# 270-210). I mounted the potentiometers in front for easy access. Every other connector was mounted on the back of the unit on an aluminum plate. When you install J1, make sure that none of its metal parts touch the system ground or the aluminum plate. Failure to do this may cause damage to U4 by shorting one of its output to ground. Also provide enough clearance for the flat cable.

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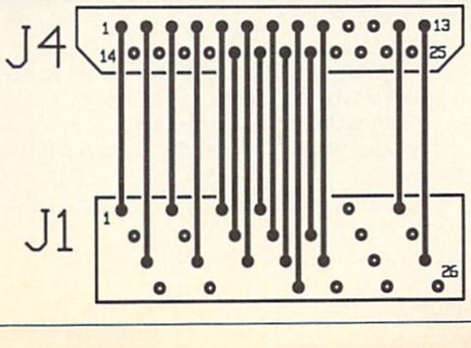
Figure Five— DB-25 to PCB Wiring Diagram



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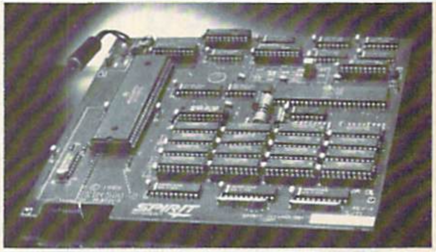

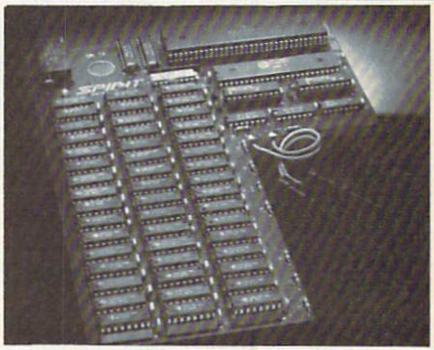

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•AC•

Table One—Parts List

Qty.	Part reference	Description
4	R1,R3,R101,R103	100K, 1/4 W resistor
9	R2,R4,R5,R7,R8,R91K, R102,R104,R105	1/4 W resistor
2	R6,R106	10K, 1/4 W resistor
1	R10	4.7K, 1/4 W resistor
1	R11	820 ohms, 1/4 W resistor
2	P1,P101	100 K potentiometer
2	C1,C101	10 uF, 10V or better electrolytic capacitor
2	C2,C102	0.01 uF polyester film capacitor
2	C3,C103	220 pF ceramic capacitor
3	C4,C5,C6	0.1 uF ceramic capacitor
1	C7	22 uF, 15 V tantalum capacitor
2	D1,D2	1N914 or 1N4148 diodes
1	VR1	MC7805C 5V regulator, TO-220 case (Motorola, Nat. Semi. ..)
4	U1,U2,U4,U102	TLC272CP LinCMOS Op-Amp (Texas Instruments)
1	U3	CD4066N Quad Analog switch (RCA, Nat. Semiconductor ...)
2	U5,U105	ADC0844CN A to D converter (National Semiconductor)
1	J1	Miniature stereo jack (1/8")
1	J2	26 pins flat cable to PCB connector (TB/Ansley)
2	J3,J103	RCA audio jacks
1	J4	DB25 connector, for flat cable Male for A500 and A2000 Female for A1000
1	S1	PCB mount DPDT toggle switch

Miscellaneous
26 conductors flat cable, 18 in. length
2 ft hook up wire
1 utility box, (Radio-Shack Catalog no. 270-210)
9 V wall transformer or battery
Knobs for potentiometers
Sockets for U1 to U5, U102, and U105

MIDI Recording Studio

reviewed by Tim Mohansingh

MIDI Recording Studio (MRS) is a new addition to Dr. T's collection of music software. MRS performs well as a high-performance, low-budget MIDI sequencer. Based on the professional-end Keyboard Controlled Sequencer (KCS), MRS offers a simplified 8-track recording/editing environment. Amiga IFF samples are supported, and the user interface allows either mouse or keyboard control.

Making a MIDI recording

One of the design goals for MRS was to minimize the user's need to be concerned with the nitty-gritty of MIDI. To begin recording, simply start playing after the program has loaded. MRS automatically detects which MIDI channel is active, and turns on the MIDI clock. When you are in the last measure of your sequence, click on the right mouse button, and MRS will finish counting out the remaining beats of the measure for use with a drum machine. Your sequence is then looped while MRS waits for more MIDI activity. This setup allows you to easily record all eight tracks of a musical passage without touching the computer keyboard ONCE. It can't get much simpler. If you want to start the current track over again while recording, just hit RE-RECORD and start playing again when you're ready.

The user interface

MRS replaces the standard Amiga system gadgets with its own methods of switching windows and returning to the Workbench. The user interface is intentionally identical to Dr. T's Atari and IBM versions, allowing those users to switch to the Amiga version with limited traumatic effects. As a courtesy, the screen colors can be changed and saved as part of an environment file in case something more subtle than red, white, and blue is desired. The MRS program can be installed on a work disk or hard drive, but it still requires the key disk to load the program. Because MRS has its own screen and does away with some of Intuition's overhead, the Dr. T program feels very nimble. For repetitive tasks, such as flipping between the recording and editing screens, or stopping and starting actual recording, MRS provides accessible shortcuts. The program is either in record/play or edit mode, each with its own screen.

Multitasking

MRS supports multitasking, allowing for the concurrent use of virtually any program. Unfortunately, the audio device is a commodity all programs want for themselves, so it might be difficult to run other audio programs simultaneously. Surprisingly, other MIDI programs can be used in conjunction with MRS, although success is not guaranteed. Using another sequencer with MRS can be handy if you have sequences you would like updated to MRS format. To try this, connect a MIDI cable from OUT to IN on your MIDI interface and run both programs, with MRS recording and the other playing. A word of caution: only have one MIDI clock running at a time. Otherwise, the system may become very confused and hang. Other Dr. T software is guaranteed to work with MRS, allowing for activities like contemporary patch editing.

Playing Amiga sounds

As any complete MIDI program should, MRS can channel MIDI events to the audio device. MRS provides a screen to load, swap, remove, or save up to 16 audio samples individually or in a bank, and edit the MIDI channel or mix level of a sample. A wraparound feature allows you to play a sample in empty octaves. Generating a bank of samples is

(continued)

> *"MRS performs well as a high-performance, low-budget MIDI sequencer. Based on the professional-end Keyboard Controlled Sequencer (KCS), MRS offers a simplified 8-track recording/editing environment."*

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painless, as the requester waits until you load all the samples you want from different places and click DONE. You can then modify path names as needed, and save a file that keeps track of the bank.

Editing sequences

MRS provides extensive editing possibilities. Traditional word processor features like cutting, copying, pasting, or deleting operate on a range set by dragging the mouse or entering begin/end points from the Amiga's keyboard.

Other options are Print, which provides a hard copy of current track data, and Split, which divides the track above and below a note of your choice. The Split option allows for split MIDI keyboard effects and selective parameter modifications such as pitch bend or controller changes. The Clear All Tracks button is more useful than you might expect. Auto-Correct allows full-featured quantization. Compress/Expand stretches or squeezes time, while Time-Reverse flips it. Velocity Scale provides an intelligent way of creating crescendos or decrescendos. With Erase, the length of a track is left unchanged, and only MIDI events are removed. In contrast, Delete will also cut out the corresponding time duration of removed notes. Eight gadgets in the edit screen allow you to jump instantly to a different track.

In terms of being an overall recording studio, MRS stops short after the single-sequence stage. Creating and editing a sequence with eight parts is incredibly streamlined. However, no song-editing features are provided. This is not surprising, as KCS is intended as the master sequencer and song editor.

The tutorial and the demo

The manual for MRS is well organized. It includes a tutorial chapter and outlines descriptions of every feature. Useful tips and charts support drum machines and external controllers, while adequate pictures provide good geographical cues for the screens. The tutorial includes explanations that utilize a simple on-disk C-major scale. Unfortunately, the single demo included on the disk does nothing to push MRS to its limits. Besides using only three tracks of MIDI data, the demo does not demonstrate the richness of a sequence containing control change or pitch bend elements.

File formats and the Big Picture

MRS joins a rather large collection of music software by Dr. T that covers a wide range of applications and computer brands. Since the MRS file format is the same for all Dr. T applications, upgrading your studio software or transferring your sequences to an Atari or IBM is relatively simple. Although the standard MIDI format is not yet supported by MRS, a utility is available for KCS allowing for the conversion from Dr. T to standard MIDI format. And for those interested, Dr. T will provide (for a nominal fee) a package explaining how the Dr. T data files are structured, allowing access to sequence data for games, word processors, or other applications.

•AC•

MIDI Out Interface

by Br. Seraphim Winslow

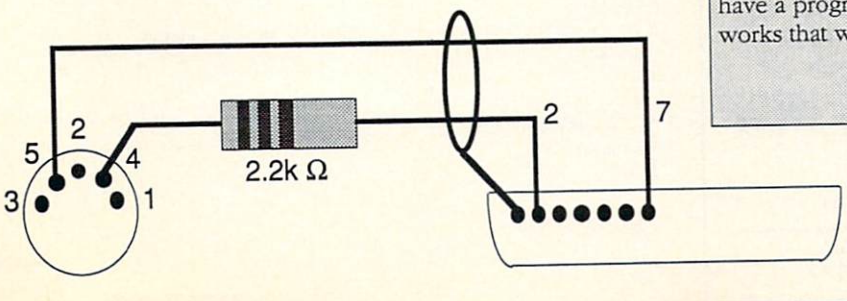
What do you do the day after you buy a "Yamaha DX 100", when every possible supplier of MIDI interfaces tells you they will have the interface in at some future date? I decided to make my own. The MIDI Standards are in "Synthesizer and Computers" from Keyboard magazine. It shows that a MIDI receiver is just an opto-ioslator, or an LED that must be turned on and off by a current from the transmitter (the Amiga).

But the Amiga has an RS 232 output, which is a voltage output. Electronic theory states that a voltage output can become a current source if a resistor is placed in series with the load (the Yamaha). "What size resistor?" was the next question. Well, too small a resistor would let too much current flow and could damage some parts. Too large a resistor would reduce the current so much, the LED in the opto-iosolator would not light, but it would not harm anything.

So I found the parts of a 5-pin DIN plug from an old tape recorder cable, a leftover 25-pin RS 232 plug, some wire, and a box of resistors. I soldered the wires to the pins of the plugs and left a space for the resistor. Next, I clipped my multimeter and a rather large resistor in series in the space in the wire. I started, "The Music Studio by Activision", and set it to play a thousand repeats through MIDI Out. I plugged in the cable and tried smaller and smaller resistors until the meter started to move. The DX 100 then began to play. Was I pleased. The 2200 ohm resistor (color code: red red red) seemed to work best. And even using new parts, the interface will cost less than ten dollars. Happy jamming.

Note: Pins #1, 2, and 3 of the MIDI DIN connector must not be connected. The pins are numbered 1, 4, 2, 5, and 3 counter-clockwise from the key. If the leads are reversed, it will hurt nothing. Just switch them. If you use shield cable, connect the shield to pin #1 of the RS 232 connector and nowhere else. Pins #2 and 7 are the signal pins of the computer end. See the diagram below.

MIDI In from Amiga Out



MIDI to Serial Output

For last three years, I have been learning music. A lot of effort, time and dollars has gone into this enjoyable, but sometimes very frustrating, process. One of the most helpful tools in this project has been my Amiga and its MIDI equipment. I enter my flute lessons with Deluxe Music by Electronic Arts and play duets with it or Soundscape by Mimetics. All this is connected to an FB-01, TX81Z, DX100, and WX7 by Yamaha, to make for a rather complete MIDI music system. But it can't seem to do everything.

Being a rank beginner in music, I need drills in hearing chords notes and intervals. Having acquired some programming skills, I decided to write my own drill programs. Simple, right? Wrong—for a beginner at least. I dug out the Lattice C and ordered the public domain disk of Soundscape, as well as, the MIDI library. With all this, I could do some super things that were not so simple. But for Soundscape, the whole program had to be there, and the MIDI library would not work with my compiler. Pointers and Intuition structures were everywhere. I even tried AmigaBASIC, but I could not set the baud rate to MIDI speed. At last I tried DOS using C and the standard IO library. It worked easily.

The first program sends a note to the MIDI interface after you compile it. Any C compiler should work. Set the serial port with Preferences to 32,125 baud, 8 bits, no parity, and 1 stop bit. You should have plugged in the MIDI interface before turning on your Amiga. Type in the program name and hear the note. Simple. Well, simpler than most at least.

The second program is a drill program with no bells. You can add your own (after all, that is the point). Don't forget to have the serial port set. Also, I used the Lattice C random functions. They might be different in other compilers. Other programming languages that can speak to DOS directly might work as well.

I have also included a diagram for a simple "out only" MIDI interface for those of you who have already spent too much.

This method will work concurrently with Soundscape, and likely with any program that does not hog the serial port like Deluxe Music. If your program opens the port, writes, and closes the port while not hogging the resource, it will be fine. I have a program change program that uses the joystick port and works that way. But that's for another time.

—Br. Seraphim Winslow

(continued)

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Listing One
MIDI Serial Test

```
/* interval test  using MIDI and stdio,  Br Seraphim Winslow  2/6/89
*/


#include “stdio.h”
#include “math.h”
#include “limits.h”
   int fp;
   char Kans[]=”xx2x34x5x6x7o”; /* intervals allowed, only major cords
                CcDdEFfGgAaBC    ‘o=octive’*/
main()
   {
   int  b,r ;
   char ans ;

     if((fp=fopen(“SER:”,”w”))==NULL)
                    /* open port use preferances to set */
     {fclose(fp);return(fp);}
   srand(100);                         /* seed for random numbers */
printf(“ n for next; p to play; q to quit \n”);
  ans='n';
  while (ans != ‘q’)
      {
      if (ans == ‘n’){
           b=RandI(11);
           r=RandI(12);
           while( Kans[r] == ‘x’ )
                  /* keep trying to get an ok interval */
                 r=RandI(12);
                   }
      if (ans == ‘n’ || ans == ‘p’ )
         {
         printf(“ What interval ( 2, 3, 4, 5, 6, 7, o)th ?\n “);
         cchord(b,r);
         }
         scanf(“%c”,&ans);
      if (ans >= ‘0’ && ans <= ‘9’ || ans == ‘o’)
         {
         if (ans == Kans[r])          {
            printf(“right\n”);ans='n';}
         else                         {
            printf(“wrong\n”);ans='p';}
          }
      }
   fclose(fp);  /* hog midi don't close port until finished */
   }

cchord(n,i)
  int n,i;
   {
   fprintf(fp,”%c%c%c”,0x90,0x3c+n,0x15);  /* send root note */
   Delay(50L);
   fprintf(fp,”%c%c%c”,0x90,0x3c+n+i,0x15);/* send second note */
   Delay(100L);
   fprintf(fp,”%c%c%c”,0xb0,0x7b,0x00);    /* send all notes off */
   }

RandI(x)
    /* pick a random number from 1 to and includeing x */
 int x;
{
int r;
   r= drand48()*x+1;
return(r);
}
```

•AC•

Digitized Sound Playback in Modula-2

by Len A. White

When programming in Modula-2, it might become necessary to use sound effects, especially in the programming of games (which is my particular ilk). On the Amiga, sound effects are created by the playback of amplitude waveforms in memory through the audio chips. Sometimes these waveforms are created by a simple algorithm such as the sine function. But for more impressive effects, sampled sounds are usually used. The included routines deal with these sampled sounds.

Listing 1 and Listing 2 show the Benchmark Modula-2 Definition and Implementation modules for AudioStuff1, a resource utility for loading and playing sampled sounds. These modules should be compiled and put in the M2L drawer (or equivalent) of your working Modula-2 disk so they can be regularly accessed. There are six routines available to the program that imports this module:

MakeBuffer:

Allocates enough chip memory (only lower 512K) to hold the waveform of the sample to be loaded. The "buffer" argument will be returned as a pointer to the start of the memory block.

***LoseBuffer*:**

Deallocates the memory originally allocated by MakeBuffer. This routine should only be called when the sample is no longer needed in memory.

InitAudio:

Opens the audio device, allocates a message port, and allocates the four voices independently so each can play a different sample. This routine "powers-up" the audio system and should be called only once at the beginning of your program before any PlaySample calls.

LoadSound:

Loads a sound file on disk into a memory buffer that was presumably already allocated with MakeBuffer. Note that the length (in Bytes) is explicitly passed to this routine and should be the same as that passed to MakeBuffer. If the file is longer than "length", only this first part will be loaded.

If the file is found, this procedure returns TRUE, otherwise it returns FALSE.

PlaySample:

Plays a given waveform of a certain length through a certain voice (0, 1, 2, or 3). Voices 0 and 3 play through one audio jack, while voices 1 and 2 play through the other. After this routine is called, the audio chip accesses the waveform buffer through DMA and, thus, a sample (or samples) will play in the background as your program continues animating an explosion, or whatever programs tend to do. The parameters remaining to be passed are as follows:

Period—amount of time (in cycle units) the sample should play. The period is inversely proportional to the frequency, so increasing the period slows down playback and vice versa. Finding the proper period for a sample might require a little experimentation.

Cycles—number of cycles of a sample to play with each call to PlaySample. In most cases this is 1, but a value of 0 makes the sample repeat endlessly with one call to PlaySample (unless another sample is played through the same voice). This might be useful for a worry-free background sound in a game.

Volume—volume ranging from 0 (no volume) to 64 (greatest volume).

***ShutdownAudio*:**

Closes all prior audio allocations done in InitAudio and should only be called at the end of your program.

The above routines assume the sound files are raw data. This means that an IFF sound file will load, but you might hear a small click sound at the beginning of playback due to the IFF header information in the file. A program such as the Perfect Sound editor on Fred Fish disk #50 is capable of loading an IFF sound file and saving it as a raw data file.

I have included a short example program, "Sampler", which shows the ease of use of these routines. It loads a user-specified sample of specified length from disk and plays it, allowing alterations of the period and number of cycles. Since this program will load any file on disk and assume it is a sample, it can be useful for determining what files on the disk are indeed sound files. If unsure of the "length" parameter for some files, just use LIST from the CLI before running Sampler.

(continued)

Listing One
DEFINITION MODULE AudioStuff1

```
DEFINITION MODULE AudioStuff1;
(* by Len White *)

FROM SYSTEM IMPORT ADDRESS;

 (* This procedure opens and allocates audio *)
 (* Init Audio MUST be called before PlaySample. *)
PROCEDURE InitAudio();

 (* Allocates length size amount of chip memory *)
PROCEDURE MakeBuffer(VAR buffer:ADDRESS;length:LONGCARD);

 (* Loads a sound file from disk *)
 (* ‘name’ should be full pathname *)
PROCEDURE LoadSound(VAR name:ARRAY OF CHAR;length:LONGCARD;
                                 pointer:ADDRESS):BOOLEAN;

 (* Play a waveform in chip memory of specified length *)
PROCEDURE PlaySample(buffer:ADDRESS;length:LONGCARD;
                     vce,per,cyc,vol:CARDINAL);

 (* Closes and deallocates-use only when finished *)
PROCEDURE ShutdownAudio();

 (* Deallocate chip memory used by sample *)
PROCEDURE LoseBuffer(VAR buffer:ADDRESS;length:LONGCARD);

END AudioStuff1.
```

Listing Two
IMPLEMENTATION MODULE AudioStuff1

```
IMPLEMENTATION MODULE AudioStuff1;
(* by Len White *)

FROM SYSTEM         IMPORT ADDRESS, BYTE, ADR, TSIZE, LONG;
FROM AudioDevice    IMPORT AudioName, ADCmdAllocate,
                           ADCmdLock, ADCmdFree, IOAudio,
                           IOAudioPtr, ADIONoWait,
                           ADIOPerVol;
FROM IODevices      IMPORT IOFlagsSet, CmdWrite, OpenDevice,
                           CloseDevice, BeginIO, AbortIO,
                           DoIO, WaitIO;
FROM IODevicesUtil  IMPORT CreateExtIO, DeleteExtIO;
FROM Memory         IMPORT MemReqSet, MemChip, MemClear,
                           AllocMem, FreeMem;
FROM Ports          IMPORT MsgPortPtr,GetMsg;
FROM PortsUtil      IMPORT CreatePort, DeletePort;
FROM InOut          IMPORT OpenInputFile,CloseInput,Read,
                           WriteString,Done;

VAR  APort  : MsgPortPtr;
     voice  : ARRAY [0..3] OF IOAudioPtr;

(*———— Stop playing a voice —————*)

PROCEDURE StopPlaySamp(VAR Msg:IOAudioPtr);
VAR r: LONGINT;
BEGIN
 r := AbortIO(Msg);
 r := WaitIO(Msg);
END StopPlaySamp;

(*————— Play a voice with a buffer ————*)

PROCEDURE PlaySample (buffer:ADDRESS;length:LONGCARD;
                      vce,per,cyc,vol:CARDINAL);
BEGIN
 IF (vce>=0)AND(vce<=3) THEN

  StopPlaySamp(voice[vce]); (*stop current sample if any*)

  WITH voice[vce]^ DO
    ioaRequest.ioCommand := CmdWrite;
    ioaRequest.ioFlags := IOFlagsSet{ADIOPerVol};
    ioaData   := buffer;
    ioaLength := length;
    ioaPeriod := per;
    ioaVolume := vol;
    ioaCycles := cyc;
  END;

  BeginIO(voice[vce]);

 END;
END PlaySample;

(*————— Cleanup after use...  ————*)

PROCEDURE ShutdownAudio();
VAR  r: LONGINT;
     c:CARDINAL;
BEGIN
 FOR c:=0 TO 3 DO
   WITH voice[c]^ DO
     ioaRequest.ioCommand := ADCmdFree;
   END;
   r := DoIO(voice[c]);
   CloseDevice(voice[c]);
   DeleteExtIO(voice[c]);
 END;  (*voices loop*)
 IF (APort # NIL) THEN DeletePort(APort^) END;
END ShutdownAudio;

(*————— Initialize four voices ———*)

PROCEDURE InitAudio();
VAR
  c:CARDINAL;
  AllocMap: ARRAY [0..3] OF BYTE;

BEGIN
  AllocMap[0] := BYTE(1);
  AllocMap[1] := BYTE(2);
  AllocMap[2] := BYTE(4);
  AllocMap[3] := BYTE(8);

  APort := CreatePort(NIL, 0);
  IF (APort = NIL) THEN
      WriteString(“Can’t allocate port!”); HALT END;
         (* Now initialize for three voices *)
  FOR c:=0 TO 3 DO
   voice[c] := CreateExtIO(APort^, TSIZE(IOAudio));
   IF (voice[c] = NIL) THEN
       WriteString(“Can’t create I/O request!”); HALT END;
   IF (OpenDevice(ADR(AudioName),0D,voice[c],0D) # 0D) THEN
       WriteString(“Can’t open Device!”); HALT END;
   WITH voice[c]^ DO
     ioaRequest.ioCommand := ADCmdAllocate;
     ioaRequest.ioFlags   := IOFlagsSet{ADIONoWait};
     ioaData              := ADR(AllocMap[c]);
     ioaLength            := SIZE(AllocMap[c]);
   END;
   IF (DoIO(voice[c]) # 0D) THEN
       WriteString(“Can’t Allocate voice!”); HALT END;
  END;   (*finished one voice allocation!*)

END InitAudio;

(*——— Load a sound file into memory ———*)

PROCEDURE LoadSound(VAR name:ARRAY OF CHAR;length:LONGCARD;
                                   pointer:ADDRESS):BOOLEAN;
VAR count:LONGCARD;
    data:CHAR;
BEGIN
 OpenInputFile(name);

 IF Done THEN
  FOR count:=LONG(1) TO length DO
   Read(data);
```

```
    pointer^:=BYTE(data);
    INC(pointer,1);
   END;
  ELSE WriteString(“Can’t find sample!”); RETURN(FALSE) END;

  CloseInput();
  RETURN(TRUE);
 END LoadSound;

 (*——— allocate a waveform buffer ———*)

 PROCEDURE MakeBuffer(VAR buffer:ADDRESS;length:LONGCARD);
 BEGIN
  buffer:= AllocMem(length, MemReqSet{MemChip, MemClear});
  IF buffer = NIL THEN
    WriteString(“Can’t allocate memory for sample!”) END;
 END MakeBuffer;

 (*——— Free memory used by waveform ———*)

 PROCEDURE LoseBuffer(VAR buffer:ADDRESS;length:LONGCARD);
 BEGIN
  IF buffer # NIL THEN FreeMem(buffer, length) END;
 END LoseBuffer;

 END AudioStuff1.
```

Listing Three
MODULE Sampler

```
MODULE Sampler;
(* by Len White *)
(* Load and play a sample. Period and repeat adjust. *)

FROM AudioStuff1 IMPORT LoadSound,PlaySample,InitAudio,
                        ShutdownAudio,MakeBuffer,LoseBuffer;
FROM SYSTEM      IMPORT ADDRESS;
FROM InOut       IMPORT ReadString,WriteString,WriteLn,
                        Read,ReadCard;

VAR wave:ADDRESS;
    period,cycles,length:CARDINAL;
    response:CHAR;
    name:ARRAY [1..30] OF CHAR;
BEGIN
 InitAudio;
 WriteLn;
 WriteString(“ Enter name of sound file: ”);
 ReadString(name);
 WriteLn;
 WriteString(“ Enter length of sample (Bytes): ”);
 ReadCard(length);
 MakeBuffer(wave,length);
 IF ((wave#NIL)AND(LoadSound(name,length,wave))) THEN
  LOOP
   WriteLn;WriteString(“ Period: ”);
   ReadCard(period);
   WriteLn;WriteString(“ Number of repeats: ”);
   ReadCard(cycles);
   PlaySample(wave,length,0,period,cycles,64);
   WriteLn;WriteString(“ -Continue (y/n)? ”);
   Read(response);
   IF response='n' THEN EXIT END;
  END;
 ELSE WriteString(“ Error!! ”) END;
 ShutdownAudio;
 LoseBuffer(wave,length);
END Sampler.
```

•AC•

*(**Professional Draw 1.0 review**, continued from page 12)*

applications above and beyond those normally considered, and (naturally) a section dedicated to using ProDraw with Professional Page. Appendices list technical support numbers, keyboard shortcuts, and a call for suggestions. The whole thing is topped off with a complete index of subjects and terms.

I had few problems and just a few suggestions for the inevitable upgrade(s). The screen prints fairly slowly, and has an indicator to tell you it is printing “part 2 of 5”, or whatever segment it is currently on. Once it told me it was printing “part 8 of 5”, which was a little confusing. When reloading a creation that includes a Bitmap file, it will request the original disk of that file. It would be nice if it saved the Bitmap on the same disk as the other info. Otherwise, you should copy the Bitmap to your data disk BEFORE you run ProDraw.

Needs List

Text operations are slow. One missing option is the ability to flow text into spaces and on curving baselines. There should be a way to allow for “kerning” of the text (moving letters closer together or further apart, in small increments). A PhotonPaint timer (MicroIllusions) would be a nice addition to all slow operations. At least then you could judge the size of the ham sandwich you’re creating in the kitchen. I found it best to “group” letters in lines of text before manipulating them. Also, be sure to hit the Return after distorting a “clip” with the distortion tool (the distortion tool still doesn’t suffice for curving the baseline of the text).

If you have a complicated piece, it helps to get out of the program (reboot) after saving your work, and then print it when you boot it up again. I had some trouble, though, getting it to print a fairly complex sign for me. It just plain refused, thinking there wasn’t enough memory. (I’ve got 4.5 megs and a 68020/68881!) Hopefully, the program will address memory expansion and accelerator boards more efficiently in the future. Lastly, I hope Syndesis or somebody creates a translation module that allows the artist to transform IFF’s (maybe four color ones) into ProDraw files. Imagine the possibilities!

If anything is going to sell more laser printers, it’s software with this attention to quality and options. ProDraw was well worth the short wait. It has become, in the limited time I’ve had to experiment with it, one of my favorite creative Amiga tools.

•AC•

Professional Draw 1.0 $199.95
Gold Disk
PO Box 789, Streetsville
Mississauga, Ontario
Canada l5M 2C2
(416) 828-0913

Snapshot

HOT New Games for the Amiga!

by R. Brad Andrews

Many of the action games available for home computers are conversions of popular stand-alone arcade games. Mindscape has brought another of these arcade take-offs to the Amiga with Alien Syndrome.

Aliens have taken over five important human outposts. Since they feed on human life energy, the only way to eliminate their threat is to completely destroy the infested outposts. Unfortunately, each outpost has human captives that must be freed. So in you go, fighting your way through waves of aliens in an attempt to rescue the hostages from each colony in the limited amount of time given to do the rescue. Upon your entry to the station, a time-bomb is set to ensure that the threat will be stopped there. So you must rescue the prisoners and get out before the station explodes.

Each colony has its own brand of aliens.that get harder the farther into the game you progress. Each has its own maneuvering style, and can be evaded or shot once this pattern is understood. It is vital to keep in constant motion, since these aliens can sense your inactivity and will home in on you in droves. Since their slightest touch is fatal, this is not at all desirable. The exit point of each colony is occupied by a super alien who will require multiple shots in its vulnerable spot before proceeding.

The hostages are scattered throughout each colony. Maps are scattered about which can be viewed, temporarily showing the layout of the station and the location of the humans you must rescue. The key to winning is learning your way and figuring the quickest and most efficient path to pick up all crewmen and make it to the exit before the time-bomb explodes. Enough time must also remain to defeat the super-alien in the exit area.

You begin each level armed with a simple machine gun. Fortunately, several improved weapons are available in certain weapons closets, ranging from a fireball thrower all the way up to a rapid fire, pulse laser. While each available weapon has its own strength, the laser appears to have the best mix between rapid firepower and firing distance, making it the weapon of choice. Since opening a weapons locker arms you with that weapon, you must be careful not to open any other weapons lockers when armed with a laser. Some other lockers can be useful, providing bonus points and one type even provides a protective drone that will follow you around and shoot behind, acting as a kind of rear guard.

The graphics in Alien Syndrome are very crisp and clear and rival that of the arcade version. The animation is smooth and sound effects compliment game play. The entire screen is taken up with a view of the local section of the ship with the usual scores, number of lives, and current level about the periphery. Scrolling is a bit awkward though. Rather than a constant scrolling view, it tends to jump, albeit smoothly, in preset increments when a player moves toward the side of the screen. This can be disconcerting, but it can be adapted to and does not hinder game play too much.

A few other problems do keep this game from reaching its true potential. Many times you can be shooting away, and an alien will march straight up just on the edge of the shots and will kill you before anything can be done. Also, several of the keyboard commands listed in the manual do not work. The spacebar actually pauses the game, not the escape key as listed. Rather, the escape key quits the current game. Finally, there is no restart at the last station therefore a large amount of time must be spent working through the starting stations to get to later stations.

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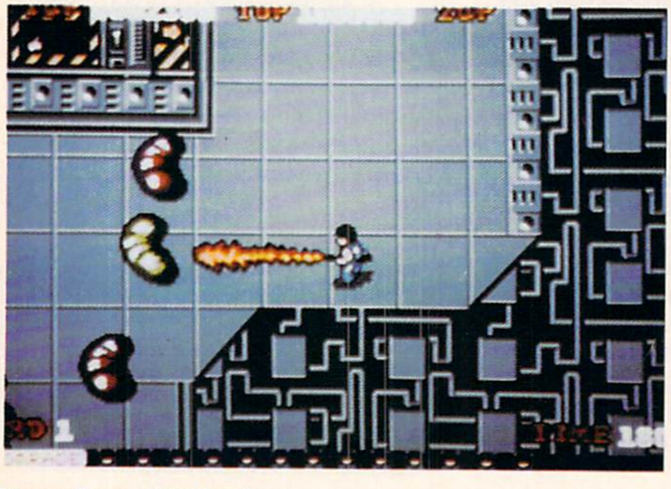

Figure One: *Alien Syndrome*

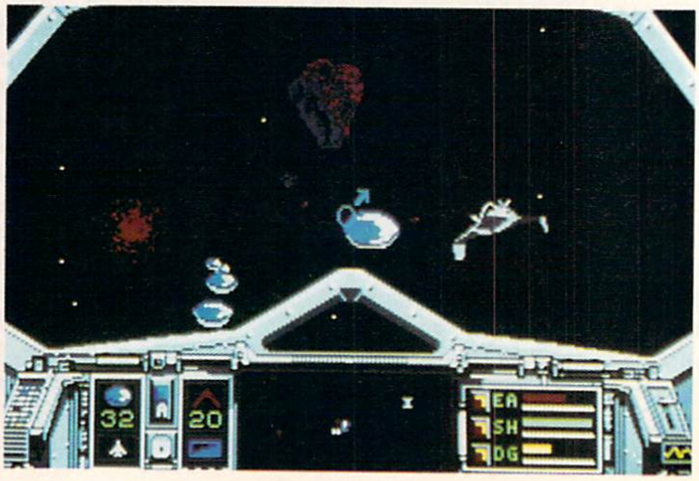

Figure Two: *Skyfox II: The Cygnus Conflict*

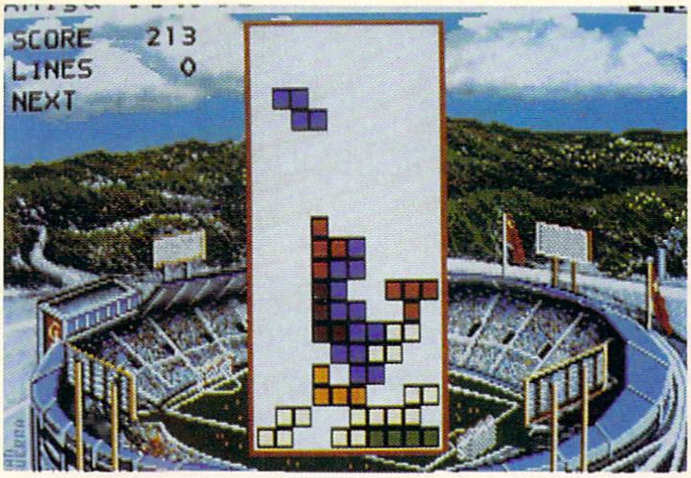

Figure Three: *Tetris*

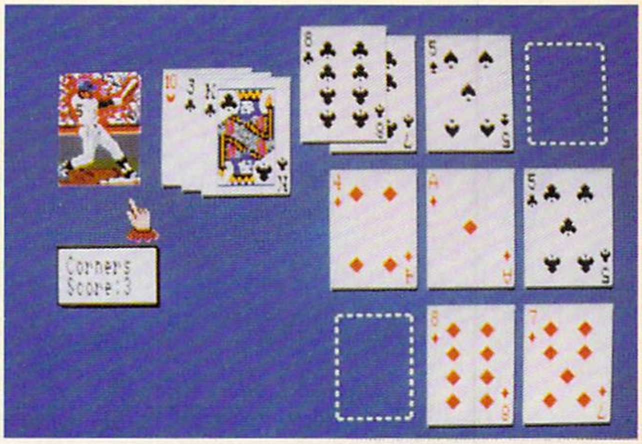

Figure Four: *Solitare Royale*

On the whole this is a very good game and provides a good value for any action fan's money.

Next on the list is Skyfox II: The Cygnus Conflict from Electronic Arts. Once again the Xenomorphs plan to spread terror and tyranny across the galaxy. Only a limited number of Warpwarriors stand in their way. The new Skyfox II has been developed by Federation engineers and scientists to serve the warpwarriors in their task. A worthy successor to the original Skyfox, this second version is also state of the art and, with capable control, should be able to defeat the Xenomorph threat.

Each game has the player carry out one of the many missions that occurred before and during the war. Some are simple, such as convoy escort and repulsing minor incursions but the others feature non-stop action, such as the all out war scenario. The difficulty level of each mission can also be adjusted, providing additional variety to the many missions.

The enemy has both fighter craft and bases available for their attempt at universal conquest. Fighters can be easily out maneuvered and shot, while bases can be easily taken out with one or two good torpedo shots. Should your ship be damaged or run low on fuel during the fighting, many friendly starbases are available to refuel and repair your craft. Enemy action continues during this time though, and repairs must sometimes be aborted to end a imminent threat.The game includes adequate documentation, though the map of the universe is printed in blue on a black sheet of paper. While this may be a good copy protection scheme, it can be difficult to read during play and detracts from the game's value.

Both the keyboard and joystick are used for game control and the game responds well to joystick flying. An auto pilot option is available for long journeys, but you will still need to keep a hand on the joystick to successfully navigate the many asteroid fields that exist around the galaxy.

The main view of the fighter features the familiar view out of the cockpit found in nearly every flying simulation. Along the bottom of the screen are the crafts controls, including a scanned view of the area surrounding the craft. This can be adjusted between short, medium and long range views to that most appropriate to the current task. Feedback on fuel and damage status is also available, as well as several other useful items. The sound also provides useful feedback during a mission. The pitch of the engine noise varies with ship speed and explosions can be heard during combat.

Anyone who enjoyed the original or is interested in a straightforward flying and shooting game should check this out.

The next game on the list could almost be considered a new attempt to subvert the West. Tetris, while a very simple game, can easily suck away many hours of time. Distributed by Spectrum Holobyte in the U.S., it was originally developed by two programmers in the Soviet Union and has since been ported to nearly every popular home computer.

Play begins with a blank play area as different geometrical objects drop from the top of the screen. As shown in the screen shot, the idea is to rotate and flip these pieces into a tightly packed pattern in the play area. As complete rows of squares are formed, they are eliminated and the top of the playfield will drop a level. Leaving "holes" in the play area can make the stack of pieces quickly rise to the top of the screen, ending the game. Play starts at a slow speed but each time ten rows are eliminated, you advance to the next level, with things moving slightly faster. Things get so fast at the higher levels that only the nimblest fingers and sharpest minds have any chance of keeping the pieces from overflowing off the top.

While not outstanding, the graphics used are very adequate for the game. The pieces themselves are color coded by type, aiding you in your attempt to quickly identify them and properly place them in the stack. Each level of play features its own special background that portrays some aspect of Soviet life. The sound also varies with level, using classic compositions of famous Russian composers. In addition to the high score, you can choose to show the next piece that will fall, the frequency of pieces so far in the game, and the title of the current background picture.

The starting level can be set to any of the game's ten levels. Adding the ability to start with a partially filled playfield of varied levels makes the game very adjustable to each person's preference. High scores are saved to disk. The game does come with a short manual, but the on screen help should be sufficient for most people.

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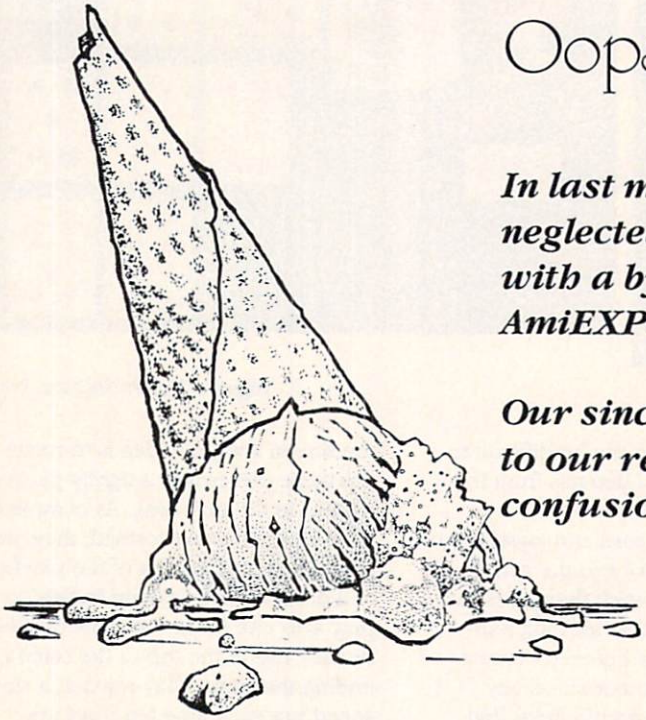


Oops... Corrections

In last month's issue of AC V4.4 , we neglected to credit author Steve Gillmor with a byline for his show report, AmiEXPO NY, March '89.

Our sincerest apologies to Mr. Gillmor and to our readers for any difficulties or confusion that might have resulted.

This game is another way to spend hours of time in front of your computer and while I take most conspiracy theories with a grain of salt, it could very well be that the Soviets have thought of the ultimate way to negate America's effectiveness, get them spending hour after hour playing this simple game. Highly recommended.

Finally this month is another offering from Spectrum Holobyte. Solitaire Royale, a fine collection of solitaire card games, has just been released for the Amiga. I thoroughly enjoy card games, especially when the computer does the shuffling and dealing for me. This package provided many hours of enjoyment.

Eight adult card games, as well as, three simple games designed for children to play are included with the program. The adult games are: Pyramid, Golf, Klondike, Canfield, Corners, Calculation, Three Shuffles and a Draw and Reno. The children's games are Concentration (where more than one can play), Pairs and The Wish.

Scoring for each game varies according to the objective, but typically consists of one point for each card played on the destination pile. Clearing the entire deck rewards the player with a small card dealing display and background clapping. While it can be hard to actually clear the whole deck, the display is a nice little touch and makes achieving this goal a little more exciting.

Tournament play is also available for the adult games. This allows several players to play with the same deal of cards to see who can get the highest score. An interesting twist on the tournament concept is Aunt Anne's Game. Here the player plays each of the solitaire games in sequence, aiming for the highest combined score. Thus it is important to play all of the games as well as possible.

The mouse is used for control of the game. A card is moved by selecting it, turning it black, and then selecting its destination. After a little practice, a player can quickly manipulate the cards on the screen.

The graphics for the game are sufficient to the task at hand. An interesting feature is the games ability to change the deck used during play. Each deck features a different pattern on the pack and a slightly different card design. While some decks have unique designs, some can be hard to read and may take some experimenting to find the deck that suits you best.

This game is one of the best computerized card games available and is highly recommended to any fan of this particular computer genre.

•AC•

Product Information

Alien Syndrome $49.95
Mindscape, Inc.
3444 Dundee Rd.
Northbrook,, Il 60062
(800) 221-9884
(312) 480-7667

Skyfox II: The Cygnus Conflict $39.95
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(800) 245-8525
in CA (800) 562-1112

Tetris $34.95
Spectrum Holobyte
2061 Challenge Drive
Alameda, CA 94501
(415) 522-0107

Solitaire Royale $29.95
Spectrum Holobyte

SYNC TIPS

INTERLACE

by Oran J. Sands, III

Arsenic & Interlace

Like a spoonful of sugar that helps the medicine go down, here's a little info about interlace that will make swallowing that bitter pill of flicker a little easier.

Whether you call it interlace, hi-res, or "Flicker-Mode", the modes with 400 vertical lines of resolution on the Amiga are one of the worst features ever offered on a computer. At the same time, they are the best thing to happen to computing world. Sound schizophrenic? Why not? The Amiga is certainly just that—several personalities in one box, something for everyone. This month, we'll examine why and how this annoying, yet useful, resolution mode exists.

Unless you are new to the Amiga, I'm sure you have been exposed to numerous explanations and diagrams about interlace. Keep reading anyway, because we are going to cover it more thoroughly. For those of you new to the topic, we'll start at the beginning.

Back when...

By scanning an electron beam from left to right across a phosphor-coated screen, a picture is created on the television screen. The beam hits the phosphor, which glows and, as the beam rescans the screen, each time a little lower than the last, a picture is painted on the screen in glowing lines. The electron beam can be made to vary in intensity, which will in turn, vary the intensity of the phosphor glow. For the most part, this system has remained unchanged since the early days of television.

The time it takes the electron beam to scan from left to right is the horizontal scantime. The number of scans it takes to fully build a picture defines a "frame" of video (similar to a frame of film). American television has always employed a standard 525 scanlines. The number of frames displayed in one second has always been 30 (although this number was changed to 29.97 when color was introduced).

There was not much programming in the early days of television. Televised images consisted more often of just still pictures and test patterns. Although program content hasn't improved much since then, we do find more motion in modern video. Such motion could not be displayed very cleanly using the scanning system of the 1930's. So, while we still have 525 scanlines per frame and 30 frames per second, the method by which these scanlines are put on the screen has undergone some change.

Before the system was altered, each scanline would be "painted" in sequence (line #1 first, line #2 following that, etc.) until the bottom of the screen was reached, with line #525 completing the picture and the video frame (see Figure 1). The process would then start all over, with a new line #1, ad infinitum. This worked well for non-moving pictures. However, trying to capture moving subjects would most often result in a very bad picture.

Since the same scanning system and scanning rates were used for the TV cameras and monitors, we can say that our image capture time, or "exposure time", was only 1/30th of a second. If the picture was captured in its entirety, this would have been fine for most action. But things do not work that way. The time elapsed between the scan of the first line and the last (525th) was 1/30th of a second and this would play havoc with our frame of video (refer again to Figure 1). If the subject of our picture moved substantially in that time, we would see a distortion of the image. The faster the subject's motion, the worse the distortion.

The obvious solution was to "expose" the video frame at a quicker rate. However, this would require changing the number of frames per second and the speed of the scan. This would mean throwing away all television equipment made up to that date. A compromise had to be made.

That compromise was to interlace the video and the system in use today by all North American television broadcasters and viewers. Instead of showing one picture of 525 scanlines in 1/30th of a second, we now show 2 pictures (called fields) of 262.5 lines, each in a 1/60th of a second (Figure 2). This gives us the same number of scanlines as the previous method in the same period of time (1/30 sec.). However, if that was all we did, our vertical resolution would be only half of what it was. So to cure that, a method of "interlacing" the scanlines of the first and second fields was developed.

Webster's second definition of interlace is "to alternate", and that is just what's done. The first set of 262.5 lines is displayed. The second set of 262.5 scanlines is then scanned onto the screen but shifted downwards (vertically) enough so the second field becomes "interlaced" or positioned between the scanlines of the first field (Figure 3).

The method of offsetting the second field scanlines hasn't really been discussed before, but it has ramifications for us. Look closely at Figure 1. Notice that the scanlines do not go directly across the screen left to right. Rather, they descend down the screen as they move horizontally. The electron beam then "flies back" or returns to the left side of the screen (with no downward displacement) and then starts its next scan of the screen. This is how TV pictures are really scanned.

Look back to Figure 2 and you'll see how we can offset the position of the scanlines by simply ending the scan earlier. In our case, we end the scan halfway through its completion. This will

(continued)

mean the next line will start not one scan lower, but a half scan lower, thus allowing all the following lines to intermingle (interlace) with the earlier scanlines. So you can see that the 1/2 scanline of each field is crucial to the display of the two sets of scanlines. If the half scanline was not present, the two fields of video would lay directly atop each other. This would give us the advantage of being able to "refresh" the image display twice as often, but with only the resolution of one-half of the 525 lines available to us. In fact, this is exactly what the 320 x 200 and 640 x 200 modes of the Amiga do!

Lo-Res Graphics

Ever notice how bright lo-res graphics are? This is primarily because the scanlines are being rescanned every 1/60th of a second, which does not give them much time to fade from the screen. And since they do not have any scanlines between them, there is essentially a black line between the scanlines which fools the eye into thinking the colors are contrastive.

High-Res Graphics

On the other hand, if that 1/2 scanline is present, we have the Amiga's 320 x 400 and 640 x 400 modes. The advantage is more resolution; the disadvantage is that the scanlines are refreshed only every 1/30th of a second. At that rate, the first field of scanlines will start to decay or fade before being rescanned again—hence, "flicker mode". Also, without that "black" scanline to separate each scanline, the colors tend to "blend" together, making the eye see hues that aren't really there. This is called "color spatial averaging", an effect in which the eye perceives color hues due to the proximity of different colors.

Now you know what interlace is and why we have it. REAL video uses only interlaced signals. Whether you're a video buff or a professional, you should know what happens if you attempt to use a non-interlaced signal.

Odd & Even

We talked about the first and second fields of video, each being made up of 262.5 scanlines. In the video biz, those fields are termed "odd" and "even" and the scanlines in each are numbered accordingly. The odd field scanlines are numbered "1, 3, 5, 7...", while the even field has lines "2, 4, 6..." As many of you have found out the hard way, most TV equipment expects to receive two fields of video, offset by the half-scanline. When they do not find that half-scanline, they can no longer discriminate between the odd and even fields. This can cause problems as minor as a jittering picture, or as serious as corrupted video.

Many televisions and monitors expecting odd-even field video signals will create a jumpy picture when fed non-interlaced video. I have seen some sets that refused to display any image at all. Video recorders, on the other hand, will record a non-interlaced signal and play it back. Often when a playback does not work, it is a result of the TV's refusal to accept the signal, and not the VCR's fault. Due to the growing popularity of video games and personal computers (which generally put out a non-interlace signal), newer TVs are designed to deal with non-interlaced signals.

Figure One

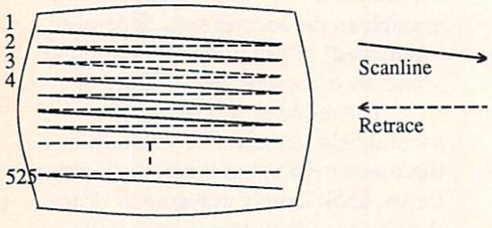


Figure Two

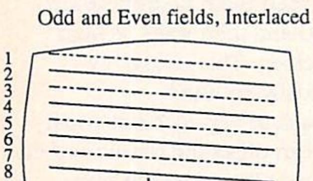
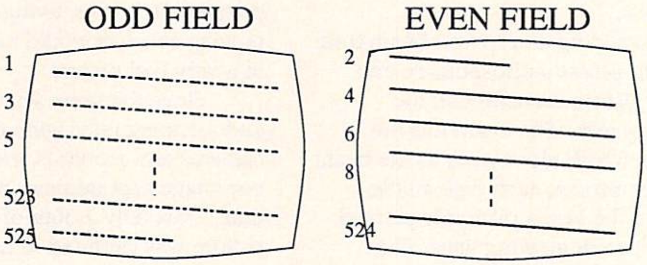


Figure Three



A much larger problem for the video professional is how to edit a non-interlace signal. In short, you can't. When editing one signal to another, it's important that the video framing is consistent. This means each odd field of video is followed by its accompanying even field. Otherwise we would be interlacing one field with the field from a completely different picture. To avoid this, editors and edit recorders look for the one-half scanline to determine if a field is even or odd. Since the odd field is first, we must make sure that any edit starts with an odd field to avoid the aforementioned problem.

With non-interlace video, you do not have any odd-even field discriminator since the one-half scanline is missing. In fact, it becomes impossible to tell one field from another. If an editor/recorder finds this to be the case, it will figure something else is wrong and simply will not make the edit. So all those wonderful animations you did are stuck on separate pieces of videotape, never to be edited together. Special effects units will also throw their hands up in disgust. There isn't much you can do with it at all in the professional studio.

One alternative can usually save the day: display an Amiga non-interlace display in interlace mode. By telling the hardware to use interlace, you tell it to display more information to the screen actually the other 200 lines that would interlace the first 200. Since you do not actually have 200 more lines of information, it reuses the first 200 lines for the second field. This has some drawbacks in that your graphics tend to look thicker (because they are), and fonts appear blockier. The picture may appear to jump somewhat. That's because you are displaying your picture at one vertical position for the first field and then down one line's width for the second field. Regardless of the look, the signal is interlaced and editable just like any other interlaced signal.

Setlace

How do you do this? Find a program called SETLACE. It's available with the WorkBench 1.3 enhancer software, as well as being found on most bulletin board systems and networks (PLINK file # 2321). I often use a program called LACETOGLE, which works in much the same way. Just invoke the program and you're in interlace mode. Running most non-interlace animations after doing this will allow correct taping of your Amiga's output. Same goes for taping games and pictures that are normally non-interlaced.

Genlocks

Another method of invoking interlace is to use a genlock with an Amiga A1000. Merely plugging in a genlock to the A1000 causes it to switch to interlace mode. Very handy! Unfortunately, the A500 and A2000 will not do this. When you boot one of these computers with a genlock attached, the screen appears strange. The pointer looks transparent when over icons. This happens because the genlock is operating in interlace and the computer is not. This is remedied by forcing the computer into interlace mode either by using a program such as SETLACE, or by running a program which uses the interlaced resolution modes of the Amiga. In fact, several people have returned genlocks claiming improper operation because they did not realize what was happening.

As you can see, interlace is a very necessary thing to have when working in video. In fact, this is one item that makes the Amiga very attractive in most studio settings because it has interlaced video output without a need for extra adaptors. If you must have one computer in your studio, make it an Amiga.

Other Computers

"But Uncle Oran," you say, "why do other computers have non-flickering displays?" Because they use non-interlaced displays! And remember when I mentioned that trying to display 525 lines of video in less than 1/30th of a sec. would make it incompatible with existing TV equipment? Well, that's exactly what other computer manufactures did. To display their hi-res screens, you need special monitors that can show twice as many frames per second (meaning the scan rate is double). This gives them the ability to refresh all 525 scanlines every 1/60th second. Since they do not interlace, every frame of video is overlaid atop the last, so decay is not visible to the eye—hence, no flicker. The price they (and you) pay is the need for special, more expensive monitors. Nor can you cannot record the signal on standard video equipment.

flicker-Fixing

Of course, if you want that same type of display on the Amiga, you can always buy MicroWay's flickerFixer. flickerFixer stores the odd and even fields in memory, then outputs the lines sequentially in their numerical order at a rate of one frame every 1/60th of a second. Again, though, you pay the price of special monitors, etc. TANSTAAFL! (There Ain't No Such Thing As A Free Lunch!)

Well, I hope the topic of interlace is a bit clearer for you now. The average video pro doesn't understand many of these facts, s now you've got a leg up on them. And for those of you who enjoy standards, NTSC RS-170A video is a rigid standard, while computer displays tend to be whatever their manufacturers want them to be—so no whining.

Last Minute News

Meanwhile back at the ranch, I've just finished playing with the new Pro Video Gold character generation program. An extensive update to the previous Pro Video Plus program, it features anti-aliased fonts, greater overscan (720 x 480) and new and quicker transitions. What's even neater is, when you save the screen to an IFF file, the anti-aliasing is saved as well! Makes incredible presentation slides! The anti-aliasing is simply wonderful and truly makes the Amiga a worthy opponent to any character generator on the market. You have to see it to believe it. Look for an upcoming review of Pro Video Gold.

The MAGNI genlock is now shipping in a new version that outputs the Amiga graphics (but not the combined video/Amiga picture) in chroma/luma form for S-VHS users.

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The Business

by Steve Gillmor

Like the first-time video producer, the professional must begin with one program, one Amiga, one monitor, and build from there. So let's begin here, where the novice and expert meet, and examine the Business of Video from the ground up.

If you were at AmiEXPO New York '89, you could easily tell that the marriage between video and the Amiga is going strong. From genlocks to frame buffers, from 2D to 4D, the emerging desktop video environment is typified by the version numbers popping up on the latest next-generation paint software. Photon Paint 2.0 arrived arm-in-arm with Deluxe Paint III, to join ExpressPaint 3.0, and anticipate the imminent arrival of Digi-Paint 3. With their animation capabilities, Photon and DPaint III have taken many of the best attributes of such Amiga trailblazers as Zoetrope, Fantavision, and Aegis Animator, and added expanded resolutions, effects, screen size, and colors for the price of an update. The promise of Deluxe Video has been brought to full flower by MovieSetter, and there are now at least seven major 3D packages released or in final beta.

The wise decision to create the IFF file format has allowed this explosion of graphics software to continue, and with it has come a cottage industry of software and hardware to interconnect not only between programs, but also between the digital computer and analog video worlds. Now it is feasible with an Amiga-based system to create moving images, sound effects, and music on videotape at a tenth of the cost of traditional studio-based production.

As an example, several years ago the artist Richard Bernstein and I produced Grace Jones' "Inside Story" album cover using the Quantel PaintBox, a $150,000 unit that adds several hundred dollars an hour in studio cost to regular video-editing time. If the Amiga with its current capabilities had been available then, we could have easily PURCHASED not one, but two complete systems with the money we spent in studio time. Of course, Grace might still want to change just one more thing, but that's another story...

With the number of Amigas shipped now past one million worldwide, the Amiga's niche market is not going unnoticed. As other computer systems boost resolution and develop video boards to output NTSC images, the price advantage that Amiga software enjoys becomes more and more significant. Yet for the average Amiga user, dealing with the sheer number and complexity of available software is an investment of both time and money not to be taken lightly. Someone who has the money to buy everything might not have the time off after work to learn how to use it; someone with time on their hands might not have the money to spare.

The video professional, on the other hand, has a different set of circumstances. While it may be a relatively trivial expense to set oneself up with an Amiga video workstation, that's only the beginning. In business, time is money and that's where the Amiga can get expensive. Like the first-time video producer, the professional must begin with one program, one Amiga, one monitor, and build from there. So let's begin here, where the novice and expert meet, and examine the Business of Video from the ground up.

Before I get too far, let me point out that the only difference between an amateur and a professional is that the pro gets paid for what he or she does. And the money comes from the client—the customer—who is always right. For this discussion aimed at the novice, let me suggest that the client is you. If you "buy" it, maybe someone else will. Not a lot to go on, but it's a start.

Now that we're all in the same frame of reference, let's assemble our basic setup. First, if you have 512K, get one meg of memory, then pay the rent. Obviously, we need at least one of each of the major programs in the paint, 2D, and image-processing areas. Add a digitizer, b&w camera and copy stand, some audio software, and a MIDI music

# of Video

package. Now sit down and start reading. In many cases, the documentation that accompanies the programs and hardware is packed with general information about each area of production.

Take the time at the beginning (while you don't have a client breathing down your neck) to absorb as much information as you can about your Amiga's basic operating system, the similarities between programs in menu and mouse commands, and the terminology of this digital world. Buy from a dealer near you, then take advantage of dealer support by getting salespeople to demonstrate techniques and shortcuts. Buy a modem and sign up with your local user group BBS and one of the pay nets (PeopleLink is the most active and reasonably priced, but you will find help on Genie and CompuServe as well). Download and trade image and anim files, load them, and analyze their content and techniques.

I would recommend saving everything you read, download, capture online, and otherwise gather; you will find things beginning to make more and more sense as time goes by. Periodically reread manuals and redo tutorials. Adapt the tutorials to simple projects using images you generate and digitize. Move images from paint program to image processing to anim, and combine differing palletes and resolutions as best you can. Confidence comes from experience in dealing with problems, and the time to learn is before your first job, not during it.

Remember, these suggestions are as much for the working videomaker as they are for the beginner. I have directed and produced film, video, and records, but the world of the Amiga is something else. Not only are you directing and producing, but you are also acting as writer, artist, cameraman, sound man, recording engineer, musician, and editor. It is easier on the budget to do it all, but harder to find the time to wear all those hats well. And there's nobody else to take the heat when things don't go well. What are you going to do, fire yourself?

Slowly but surely your studio is beginning to take shape. While you were woodshedding and absorbing the first wave of input, you probably passed Go a few times and built up the money to fill in some gaps. At this point, it might be wise to make some decisions. The lure of 3D software and mixing live-action with Amiga graphics will be hard to resist, but there are intermediate steps you can take. The world of structured drawing and 3-dimensional animation is hard to navigate, and the software is expensive and memory-hungry.

With RAM prices dropping rapidly, and speeded-up '020 and '030 boards now entering the marketplace, it might be smart to upgrade your hardware at this juncture, and pick up Byte-by-Byte's 3D Cookbook and Impulse's The World of Silver. These new videotape tutorials go a long way toward bringing you up to speed in this complex area, and they are also good examples of Amiga video production.

By this time, you are wise enough to know you need a hard drive, a broadcast-quality genlock, a synthesizer, MIDI box, and a VCR capable of doing single or two-frame edits. But what I'd recommend as your next purchase is none of the above. Instead, go down to your computer store and ask to see the output from a Star NX-1000 or comparable color dot-matrix printer.

It's time now to finance the rest of your studio with some jobs, and you'll need to appear as business-like as possible. By carefully using a paint program, word processor, and some experimentation, you can create a business logo and letterhead. Use your artwork to put together a transmittal cover sheet for use with fax machines. Transfer a variety of images from disk to paper and learn how fonts and colors change when they are printed. And when your friendly computer dealer says enough's enough, take out the $300 and bring your printer home.

Sooner or later, you will get that first job. That's only half the battle. With the Amiga, you are in virgin territory, as much inventing how you do things as actually doing them. In fact, we invented our first job.

My partner Tina Chase and I, both with extensive backgrounds in the comedy world, decided to target the exploding standup comedy arena as the focus of our first Amiga video product. We went to one of the most prominent comedy clubs in New York, presented our ideas, and got the go-ahead to test out our concepts on their giant projection screen. We agreed to a token compensation, contracting to provide them with promotional videotapes that creatively cycled images, news, and upcoming club events.

When we first started doing videos for Caroline's At the Seaport, we used Photon 1.0 and Deluxe PhotoLab to clean up and colorize head shots of the headliner comedians we'd digitized with DigiView. Our first obstacle was the limited number of colors in our final stage animation software, Deluxe Video. Backgrounds could have eight colors, and objects moving across the screen could contain an additional seven colors plus color zero. We soon found that the most accurate way to separate images from their original backgrounds was to digitize them in HAM interlace and use Photon's free shape fill to cut out around the profile.

However, when we used ADD from Photon's mode menu to add color 3-1-0 to simulate fleshtones, the resulting palette was difficult to reduce using Pixmate. We had to make many hard choices to maintain both fleshtones and primary colors for titles and other objects. We cannibalized DeluxeVideo's library of stock animations, attaching a huge "poster" of Emo Phillips below the blimp animation and towing it slowly

(continued)

A Summer Treat

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Amazing Computing has lined up 3 HOT issues for the Summer months to provide a cool look at some special topics on the Commodore ***AMIGA***. Included in the regular Summer issues of AC will be the following special focus sections:

- A special ***AMIGA*** **Technical** supplement in June—This feature will provide Amiga "techies" and non-techs with some new programming insights.
- A special ***AMIGA*** **Games** supplement in July—The weather will be hot, but so will Amiga games. The games supplement will keep AC readers informed on the latest and greatest in Amiga games.
- A special ***AMIGA*** **Video** supplement in August—AC's video supplement will showcase the Amiga's powerful video abilities with articles to help users literally **see** what the Amiga can do.

Amazing Computing always provides HOT information on the Commodore Amiga market no matter what the weather. But this Summer, the Heat is on as the Amiga continues to grow in the consumer market. AC will be there to guide its readers through the changes, developments, and new options the Amiga's rapid growth has provided.

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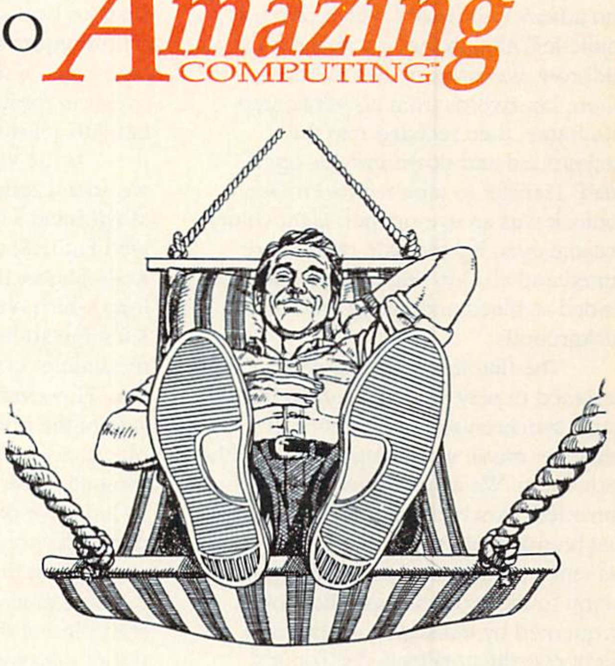

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across the horizon. We digitized a can of Campbell's Soup and painstakingly fashioned "Caroline's" out of the letters, then added a picture of Caroline in the center of the label. We made the sequences modular, so we could easily change the showtimes and scheduled performers' information while getting the most out of each vignette.

Sometimes we turned limitations into advantages. Faced with a photo of comic Jeff Altman that cut his head off at midbrow, we fashioned an animation where buzzwords from his act floated into frame, then receded into the background and down into his open head. Transfer to tape with a ProGen genlock was an eye-opener. Light colors became even lighter, skin tones were muted and chalky, bright blues and reds tended to bleed and merge with many backgrounds.

The Caroline's videos were designed to play ambiently above the stage, synchronizing randomly with whatever music was being piped into the showroom. We adjusted and color-corrected, slowly developing a format that blended into the club atmosphere yet lent a certain technological sophistication to the proceedings. The club is frequented by managers, agents, and talent coordinators from the Tonight Show and the Letterman Show, offering us an excellent opportunity to get industry feedback and promote our Amiga production techniques. We were eventually noticed by the people from Catch A Rising Star, who asked us to create a video to promote their comedy club at the Hyatt Regency Hotel in Chicago.

By the time we began production on the Catch A Rising Star video, the level of sophistication of software and the growing interconnectivity of Amiga hardware combined to create a much more fertile environment. MovieSetter gave us 32 colors at a time and a built-in storyboard generator we quickly took full advantage of to sketch out and dynamically update our scenes as the client learned what we were capable of doing.

I adapted techniques from film editing by laying out a series of stills in sequence to last the two minutes in running time the final product required for looping. This "work print" became a template with modules for each sequence. Separately we screened live footage from various Catch clubs around the country, their Tenth Anniversary TV special, and other MTV and news footage. Pulling out several sequences, we designed graphic surrounds for them that fit in with the overall concept of channel-switching around the dial. Tina altered a FrameGrabbed title image from 60 to 6 Minutes and we animated a second-hand onto her version of the famous ticking stopwatch with DPaint III. We also prepared a version without the clock to genlock over one of the live-action sequences, taking care to save both parts of the vignette in as severe an overscan format as we could safely load into MovieSetter's low-res movie file.

As the video began to take shape, we added sound effects, some from MovieSetter's library, others digitized with FutureSound and edited with AudioMaster II. We were faxed the Catch logo which we digitized using DigiView 3.0's line art mode, then stenciled onto the sliding doors of an elevator animation. However, when we loaded each side of the door into MovieSetter, the objects were so big they stretched the program's use of the blitter hardware to its limit. We orginally accomplished the doors closing in ten frames for each section, but the program couldn't handle it in real time. Finally, we experimented with placing the sound effect of the door's opening just slightly before, and ending imperceptibly later than the actual movement. We found that the illusion worked as well with only five frames of animation.

Each module was developed in the same way, adding various cutaways, closeups, scrolling backgrounds, and ADO-type brush rotations and sizings. The ADO effects were created in Zoetrope, Sculpt 4D, Photon 2.0, and DPaint III, saved out as IFF files, loaded into MovieSetter's clipboard and edited into sets. We had to take care to keep the largest size of each brush effect within MovieSetter's Set Editor window, about two-thirds the size of the full screen. The process is time-consuming and sometimes frustrating, but the result is large segments of animation in small files that can be laid onto tape in real time.

Each sequence now had its own rhythm and pace. Music was added, composed with Music-X—with a helping hand or two from M—and sequenced out through the ECE MIDI interface to Yamaha's new DS-55 synthesizer. The DS-55 can play four separate voices simultaneously, and together with several of the Amiga's internal drum sounds, formed a sophisticated yet simple orchestration. The tracks were mixed through a Teac PortaStudio to the hi-fi audio channels of a VHS video recorder and remixed with the sync Amiga sound effects and voice-over narration, then laid onto our master 3/4 inch videotape.

Each animation segment was laid to videotape using Maurice St. Saveur's Exorcisor single-frame edit controller. Live footage was integrated with Amiga graphics through Magni and Gen/One genlocks, married with the animated sequences to produce a seamless continuum. To simulate the effect of channel switching, we had to videotape the TV screen while flipping channels, then FrameGrab several fields of static, then animate them in DPaint with a touch of color cycling. Finally, the master was duped and looped onto another 3/4 inch one-hour tape, from which several 1/2 inch VHS dubs were made.

It is clear that quality video can be produced using an Amiga video work station system. Considerable time must be allocated to allow for experimentation and integration of digital and video equipment. The client should be kept away from this aspect of the process, but included at the interactive storyboard and concept stages, where the Amiga shines.

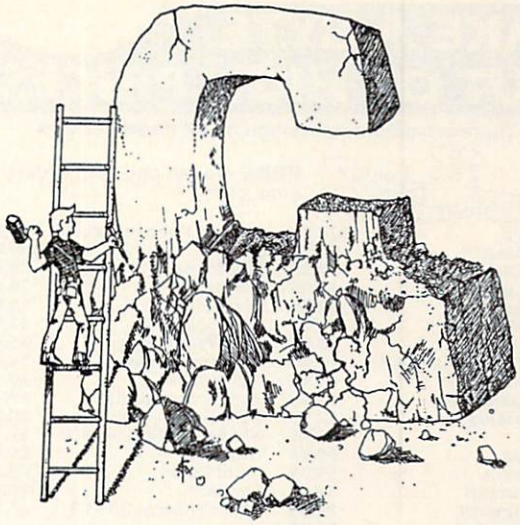
As far as production techniques are concerned, think things through before you commit to palettes, resolutions, and animation formats. Take the time to familiarize yourself with how different programs handle Color 0, color cycling and palette processing. Make detailed notes and print them out. Print voice-over copy out in double-sized Bold. Try to use a logical system for naming .pic(ture) and .br(ush) files, and set up subdirectories so you can find files quickly. When you discover and refine techniques that work, document them and use them as templates for new sequences. Save often and back up everything. Disks and tape are cheap. Your time is not.

The Amiga is a revolution in video. It's also an evolution. Video is not just picture, but sound as well. It's drama and humor, timing and juxtaposition. And most important, it is a tool, providing a better way to communicate. Video will grow; it will become more than what it is today, more than what we can predict tomorrow.

•AC•

On the Crafting of Programs

A Look at Lattice C 5.02



by David J. Hankins

In this month's column, I'll review the latest offering from Lattice: the 5.0 release of Lattice C for the Amiga. But before we get into the review, I wish to point out a few errors—two typos and a misinterpretation—that appeared in Vol. 4.2 's column on ANSI C.

First, on page 73, the line

```
y = f1( a, b, 32 ) ;
```

was meant to read

```
y = f1( a, b, 32L ) ;
```

And on page 75, the two lines

```
#define printit( number
    printf( #number " equals %d", number )
```

should have been one line, and should have read as follows:

```
#define printit( number ) printf( #number " equals %d", number )
```

Well, that takes care of the typos. The misinterpretation concerns the use of the size_t variable type. I was under the impression that size_t needed to be large enough to accommodate a pointer. Actually, ANSI specifies only that size_t be an unsigned int, or an unsigned long int—the type the operator size of() returns. So, Manx will have to redefine their implementation of malloc() so it accepts unsigned long ints to make their compiler conform with ANSI. However, the logical choice for size_t on the Amiga is an unsigned 32-bit quantity. As Rex Jaeschke explains in his latest book, *Portability and the C Language*, "...(size_t) should reflect the maximum array subscript possible for the implementation since, after all, you should be able to find the size of the largest possible char array that you can create." In that Manx C already allows you to use array subscripts greater than 64K, there remains some hope that they will choose to typedef size_t as unsigned long int. However, Manx's current implementation of sizeof() returns unsigned int. To maintain compatibility with pre-ANSI releases of their compiler, Manx will probably choose to typedef size_t as an unsigned int instead of an unsigned long int. Oh well, back to lmalloc() with Manx.

Well, since I hate dwelling on mistakes (especially my own), on to the review!

Lattice 5.0—an overview

With the release of their 5.0 C package, Lattice has completely revamped the way they bundle their C software. Previously, Lattice sold their C compiler, LSE editor, and Compiler Companion utilities as separate products. However,when I received my review copy, I was pleasantly surprised to see that each of these products is now included with Lattice 5.0. Also included with 5.0 are several new programs: lc1b, a "big" version of their compiler which can generate cross-referenced listings of source code; CodePRobe, a source level debugger; go, a global optimizer; and Lattice's lprof and lstat profiling utilities. The 5.0 Lattice C documentation now comes in two 3-ring binders, and the various programs and utilities are distributed on 5 diskettes.

Shortly after receiving 5.0 in the mail, Lattice sent me a bug-fix update, Lattice C 5.02. This update is being sent to all registered users of 5.0 free of charge. The following review is based on the updated 5.02 release of Lattice C. However, I will use the terms 5.0 and 5.02 somewhat interchangeably.

Lattice 5.0 has a suggested retail price of $300.00. Registered owners of 4.0 may upgrade to 5.0 at a cost of $75.00. And for registered owners of both 4.0 and the Lattice Compiler Companion Utilities, the upgrade to 5.0 will cost only $45.00. Considering the amount of software Lattice is offering for the dollar, one's first impression might be that Lattice C 5.0 is a much better bargain than Manx C 3.6a. Let's see if this perception is true.

The Lattice C compiler

The Lattice C compiler is a two-pass compiler. In the first pass, a "quad" file is produced. This quad file is then processed by the second pass to produce an object module. These passes may be invoked separately using two commands, lc1 for pass 1 and lc2 for pass 2, or all at once using the command lc. One drawback to the quad file approach is that an assembly language translation of the compiler's work is not immediately available to the user. Also, in-line assembly language code is not supported.

The Lattice C compiler has an incredible,almost overwhelming, number of command line options available. Looking over the Lattice documentation, I found that lc could be invoked with some 29 different options, many of which offered suboptions. In the user manual, 19 tersely written pages are

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devoted to this topic. However, I regard the multiplicity of options as beneficial. They permit programmers to tailor the compiler's output in accordance with their needs. To Lattice's credit, the novice C user has not been overlooked in their zeal to add powerful features. Using the -L option, the Lattice C compiler will invoke their linker automatically, making it very simple to produce executable code. The Lattice text editor, LSE, has been fully integrated with the compiler.

One option new to 5.0 is the ability to precompile header files. Using this option, header files are compiled once, and then referenced whenever necessary. This can speed compilation times up considerably, especially when using large include files such as those supplied by Commodore-Amiga. Using precompiled header files, a compiler need not rehash old ground each time it encounters a #include statement. Strangely, when using Lattice 5.02, the precompiled header files are directed by default to the logical directory quad: instead of the directory the target program is in.

A welcomed addition to the Lattice 5.0 release is support for the proposed ANSI C standard. Lattice 5.0 now fully supports function prototypes (including prototypes for functions taking variable numbers of arguments), token merging, stringization and merging of adjacent character strings. Lattice 5.0 even includes an option (-prp) to generate header files containing prototypes for all functions defined in a module. Aside from its annoying habit of mistaking longs for ints (see example), I found this option to be extremely useful.

Example:
the prototype generated for

```
void test( long *a, long b )
{
}
```

was

```
void test __PROTO((int *a,
                   int b));
```

I found that the Lattice C compiler does much more error checking than the Manx compiler. For instance, if you use variables before initializing them, as in:

```
void main()
{
   int a, b ;

   a = b ;

}
```

Lattice C will issue a warning:

```
   test.c 6 Warning 94: uninitialized auto variable "b"
```

Warnings such as these can save you from many frustrating hours of debugging. I am hopeful Manx will incorporate similar error checking into the upcoming 5.0 (yes, they apparently intend to skip right over 4.0) release of their compiler.

The object modules produced with Lattice C conform to the standard object module format rules found in the AmigaDOS Reference Manuals. This is of benefit to users wishing to link object modules produced using Lattice C with object modules produced by other compilers/assemblers. In contrast, Manx C produces object modules in a proprietary format. Manx provides a utility to convert Amiga object modules to the Manx format, but this utility cannot go the other way around; you can't convert Manx object files to Amiga object files.

Also in contrast to Manx C, Lattice C defaults to 32-bit integers; Manx defaults to 16-bit integers. Although 16-bit integers may make certain operations slightly faster, Lattice claims that the overall performance gained by using 16-bit integers instead of 32-bit integers is negligible. To see if they were right, I decided to compile a fairly large program—first with Lattice, then with Manx—and compare the results.

Comparatively speaking

The program I chose was A68K, Charlie Gibbs' freely distributable assembler. The A68K source code is available in the public domain and consists of 2 header files and 8 C modules. In comparing the Lattice and Manx packages, I was interested in answering four questions:

- How long does it take to compile C source code files?
- How long does it take to link the resulting object code files?
- How large are the executable programs produced?,
- How fast do the executables run?

Table 1 addresses these questions.

In looking over the results from Table 1, it seems Manx is about 18% faster than Lattice in compiling and linking code. Also, Manx's executables seem to be somewhat smaller than Lattice's, but here the difference is slight. As far as the speed with which executables run, Lattice seems to hold a narrow lead over Manx, producing code that is roughly 5% faster.

What surprised me most about the results shown in Table 1, is that there does not appear to be much difference between the non-optimized and globally optimized versions of Lattice-generated executables. In retrospect, having to wait an extra 30 minutes for Lattice's global optimizer to do its stuff hardly seems worthwhile. Hopefully, the global optimizer will be made faster in latter releases.

A caveat please

The results shown in Table 1 reflect the performance of the Lattice and Manx C compilers on only one program—A68K. This program does not use floating-point arithmetic, nor is the generation of code specific to any processor other than the MC68000 required. Also, precompiled header files were not used, and neither compiler was made resident. Therefore, given different test circumstances (different programs being compiled, use of floating-point operations, etc.), it is quite possible that the relative performance of one compiler versus the other could change. In addition, it might be overstating things a bit to say, on the basis of having compiled just one program, that compiler X is better than compiler Y.

Benchmarking compiling is a topic always open to controversy; no matter what yardstick is used to measure performance, someone will protest. Be that as it may, I conclude, by looking at Table 1, that the performance of Manx and Lattice is extremely close. Manx compiles and links code faster than Lattice and produces slightly smaller executables, but Lattice produces executables which run faster. Your mileage may vary.

Entomology

I did encounter some bugs in the Lattice compiler. I've already mentioned the problem with generating prototypes for functions that take long integer arguments. Also, I was able to crash lc with the following (admittedly incorrect) code:

```
#define __PROTO(a) a
/*              -  Notice that right here
                |  I've left out a parenthesis.
                |  This, combined with the
                |  appearance of the second
                |  argument on a new line, will
                |  cause a guru.
                |
                v                    */
void bomb __PROTO(int a,
                  int *b));

void bomb( int a, int *b )
{
    return ;
}
```

Also, I ran into problems when trying to use the -rb option for registered parameter passing. A68K, when compiled with -rb, crashed.

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CodePRobe—Lattice's new source level debugger

New to 5.0 is CodePRobe, Lattice's source level debugger. Next to the compiler itself, I rate source level debuggers as the most important ingredient in a C software package. So how does CodePRobe stack up against SDB, Manx's source level debugger? Let's look and see.

To use either CodePRobe or SDB, you must invoke the compiler and the linker with special options, telling them to make source code information available to the debugger. Following the AmigaDOS executable file format, Lattice places its debugging information directly into the executable program in HUNK_DEBUG sections. This approach has the drawback of increasing the size of the executable when debugging options are chosen. Fortunately, you do not have to completely recompile your programs to eliminate the HUNK_DEBUG hunks; blink will strip an executable of debugging information if it is invoked with the NODEBUG option. In contrast, Manx chose to use a proprietary debugging technique; instead of placing debugging information into the executable, it is placed into a separate debug file. Thus, with Manx, executables do not increase in size when debugging options are selected.

In reviewing the Lattice and Manx source level debuggers, I found both programs to be quite good. However, if you want to directly display arrays with Manx's SDB, you're out of luck

(continued)

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for now. No matter how I tried, I could not get SDB to perform this function. Not having the ability to display an array in its source format greatly reduces the utility of SDB. In contrast, Lattice's CodePRobe worked flawlessly when displaying array variables.

In defense of SDB, there are areas where Lattice's CodePRobe could use some work. For one thing, programs prepared for use with CodePRobe increase enormously in size. When I compiled A68K with Lattice's -d5 (full debugging information) option, the resulting executable went from 46,452 bytes to a whopping 112,860 bytes—an increase of some 143%. By comparison, Manx's debug file for A68K was only 16,911 bytes long.

Also, SDB has a feature not available in CodePRobe. Function return values can be obtained by entering the function's name and arguments at SDB's prompt. For example, if you had a function named (you guessed it) foo(), and you were interested in knowing what value foo(2) would return, you would simply enter

```
p foo( 2 )
```

(p is SDB's command for "print to screen") at SDB's prompt. This capability does not exist in CodePRobe.

The final area in which CodePRobe is lacking is its "watch point" feature (Manx refers to "watch points" as "expression breakpoints"). With this feature, a variable is monitored and, at the instant it changes value, program execution is halted and you are returned to the debugger.

Watch points are an extremely powerful feature of debuggers. On a good day, you can track down the most difficult of all programming errors, overwriting memory (perhaps by exceeding array bounds, or by writing past the end of an allocated block). Memory overwrite errors can step on variables completely unrelated to the task at hand. With luck, the same variables will be stepped on each time the program runs, thus making it possible to catch the error with a watch point.

My gripe with Lattice's watch point feature is that it makes program execution very, very slow. In fact, programs slow down so much, the watch point feature is rendered largely useless. Manx's expression breakpoint feature is much faster. This is probably because SDB evaluates expression breakpoints only upon entering and exiting a function (when the user's program is activated with the go command), instead of after the execution of each instruction.

Preferences

So which do I think is better, CodePRobe or SDB? I marginally prefer CodePRobe. I really like CodePRobe's interface (it uses menus, SDB is strictly command-line driven), as well as its ability to display array variables directly. On the other hand, I like SDB's ability to display function return values. And if I need to use watch points (er, expression breakpoints), SDB wins hands down.

Documentation

The Lattice C 5.0 documentation comes in two 3-ring binders and is organized into 6 sections: User's Guide, Utilities, Commands, Editor, Debugger, and Library Reference. Each section begins with a table of contents and ends with an index, and at the end of the manual is a master index covering all 6 sections. In general, I found the Lattice documentation to be fairly good, at least as far as technical manuals go. This said, there are several areas in which the documentation could be improved.

In places, the 5.0 documentation lacks clarity. For example, on page L166 in the discussion about qsort(), the user manual states, "As an extension to the normal UNIX implementation, we also pass a third argument, the element size, which can be ignored." I think I know what Lattice intended to say, but then again I'm guessing. At any rate, if you were to call qsort() with the wrong value in the element size variable, you would get incorrect results; contrary to their claim, the element size variable most definitely cannot be ignored.

In other areas, the Lattice user manual is incorrect. For example, on page L20, in the discussion of malloc(), Lattice states that, "By ANSI definition, calloc, malloc, and realloc can only allocate 64K at a time." In truth, ANSI places no such limitation on these functions. Happily, Lattice's implementation of malloc() doesn't seem to know about the stated 64K limitation. I was able to allocate memory blocks much larger than 64K with this function.

My final complaint with the Lattice documentation is that certain information appears to be missing. Nowhere in the manual is the use of 16-bit integers clearly explained. "What libraries should I link with", I wondered, "and are there any special limitations (array subscripting for example) that I should be aware of when using 16-bit ints?" I was finally able to figure out what libraries you have to link with by consulting an "addendum.doc" file included, not in the user manual, but on one of the Lattice diskettes. But I still don't know if any special limitations apply.

In spite of these criticisms, I am generally satisfied with the Lattice documentation. I only hope Lattice will make good their commitment to improving the quality of the manuals as implied on page G6:

> "One final note on the style and contents of these manuals: Please let us know if you see errors or omissions, or if you want to propose a better way of presenting certain information."

Utilities

Looking over this review, I see I've been a bit long-winded. So I'll provide just a brief overview of the Lattice utilities.

The Lattice utilities consist of 13 programs: build, cxref, diff, extract, files, grep, lmk, lprof, lstat, splat, tb, touch, and wc. Lprof, lstat, and tb are new utilities. The others were previously available as a separate package called the "Compiler Companion". For a review of the Compiler Companion utilities, see Gerald Hull's article in *Amazing Computing* V.4.1.

Lprof and lstat are profiling utilities (if you don't know what profiling utilities are, you might want to look at "On the Crafting ..." in *Amazing Computing* V.3.10, and V.3.11). Lprof is used to prepare an intermediate profile file called "prof.out". It works by interrupting program execution at constant intervals and noting the address at which the interrupt occurred. To translate this information into an intelligible form, you run lstat. Lstat converts the prof.out file into a report which tells you the percent time spent executing each function in your program and the number of times an interrupt occurred during each function's execution. I used lprof and lstat to profile A68K. Both lprof and lstat seemed to function perfectly. However, I noticed that no options were available to vary the sampling frequency used by lprof. I would think that misleading results could be obtained for some programs if the sampling frequency were too large or, if by some trick of fate, a function's execution were periodic and in-sync with the sampling rate.

Tb is a utility used to provide information about abnormal program terminations. Since I normally use debuggers to diagnose such problems, I did not have occasion to evaluate tb.

Vendor feedback

After completing this column, I sent copies of the review off to both Lattice Inc. and Manx Software Systems, Inc., asking them for comments.

Shortly after sending the review to Lattice, I was contacted by Kent Premo, their technical documentation specialist and editor of the Lattice user manual. Mr. Premo acknowledged that the present Lattice user manual has a few shortcomings, but pledged to correct any deficiencies in the next printing.

A few days later, John Toebes, the chief programmer behind the Lattice compiler, called me on the phone. Mr. Toebes provided a number of interesting comments.

Mr. Toebes mentioned that the A68K benchmark did not take advantage of Lattice's powerful registerized parameter feature. To avoid the problems I encountered with the -rb option, Mr. Toebes recommended I compile using -rr and function prototypes. Following his instructions, I came up with a version of A68K that was 44,572 bytes long and which assembled the list source code in 56 seconds.

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Out of curiosity, I wondered what would happen if I recompiled A68K using both registerized parameters and global optimization. Invoking lc with the -rr -O -v options resulted in an A68K executable that was 43,292 bytes long (roughly 4% smaller than the Manx version). The 43,292 byte version assembled the list command in 55 seconds (about 10% faster than Manx). Judging from this last compilation, it would seem that Lattice 5.02 is capable of producing smaller, faster code than Manx 3.6a if registerized parameters, in-line code, and global optimization are used (if your program calls Amiga functions, you'll also want to use #pragmas).

As previously mentioned, I also sent a copy of this review off to Manx for comment. As of this writing, Manx had not replied.

Concluding remarks

So, is Lattice C 5.0 worth the $300.00 (you'll probably be able to get a better price if you shop around) suggested retail price? Is 5.0 better than Manx 3.6a? Yes. And probably.

Lattice C 5.0 is definitely worth the money. You get an amazing amount of software in their C package and, overall, Lattice's programs work very well indeed.

(continued)

In my experience with Lattice 5.0, I've found the use of function prototypes to be of immense benefit in reducing programming errors. Also, Lattice's compiler is a bit friendlier than Manx's, warning you of possible mistakes rather than assuming you know what you're doing. The addition of an integrated editor and profiling utilities are an added bonus. So, at this point in time, I'd say that Lattice 5.0 is probably better than Manx 3.6a.

I say probably because the 5.0 package is buggier than Manx 3.6a (as we've seen, not all bugs were fixed in the Lattice 5.02 update). And there's nothing worse than spending days tracking down a potential bug, only to find that the compiler was at fault. Fortunately, Lattice seems dedicated to fixing bugs. With a little more work on their part, I am confident Lattice can chip away any rough edges they didn't catch in their 5.02 update, and polish the underlying product to a brilliant sheen.

The bottom line is this: I feel that the advantages offered by Lattice (ANSI C compatibility, a global optimizer, profiling utilities, and an integrated editor) far outweigh any disadvantages caused by the few bugs I found. I recommend Lattice 5.02 over Manx 3.6a.

Next time

Next time, On the Crafting will take you through the development of a small, but hopefully useful, programming utility. So until then,

```
printf( "Goodbye World.\n" ) ;
```

About the author

Mr. Hankins is president of OTG Software, a small, but growing, (at least he hopes so) software publisher. If you would like to contact Mr. Hankins, he can be reached on People Link (OCS378—still hasn't got a "real" name), Compuserve (76515,1650—not a name, but a number!), or BIX (dhankins—what kind of a name is "dhankins" anyway?)

•AC•

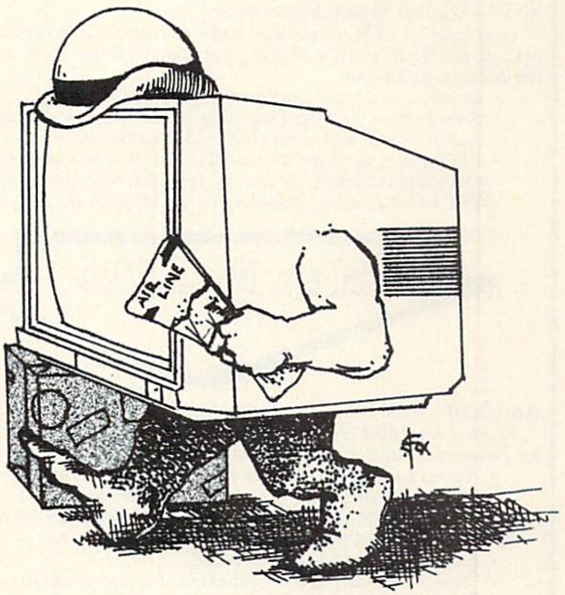
Table One
A Comparison of Lattice C 5.02 with Manx C 3.6a

	Lattice C 5.02		Manx C 3.6a
	No opt.	Global opt.	
A68K (Version 1.10)			
Compile time	10:01	46:21	8:22
Link time	0:37	0:36	0:38
Total (compile + link times)	10:38	46:57	9:00
Size of executable	46,452	45,100	45,052
Speed of executable	0:58	0:56	1:01

Notes:

1. All times given in minutes:seconds format.
2. All file sizes in bytes.
3. Pre-compiled header files were not used in any of the trials.
4. Compilers and linkers were not made resident.
5. In all cases but the Lattice "Global opt." case, intermediate files were directed to ram:. Note, however, that the very large increase in compilation time for the global optimization case is due to the inherent sluggishness of go, and not to the use of disk-based intermediate files (go has a large appetite for ram: which forced me to use disk-based files).
6. For the "No opt." case, lc compiler was invoked without any optimization options. However -v was specified to disable stack checking (Manx does not implement stack checking unless the appropriate option is given) and the string.h header file was included to produce in-line code.
7. For the "Global opt." case, lc was invoked with the -m0t -O -v options to produce code optimized for speed, to invoke Lattice's global optimizer, and to disable stack checking. The string.h header file was included.
8. For all Lattice cases, blink was invoked with the SMALLCODE SMALLDATA NODEBUG options.
9. The Manx compiler, cc, was invoked with the +x5 -Z

An AMIGA Adventure



by Larry White

I've made no secret of the fact that, for me, the Amiga is a sideline (albeit a passionate and consuming one). My more-than-full-time occupation is Technical Director for a major consumer photographic publication, an endeavor in which I've found the Amiga useful. I have outfitted almost all our editorial staff with Amigas— with Wordperfect and a few utilities from the Gizmoz collection—for their writing and editorial duties. While this decision caused some concern from our MS/DOS-oriented corporate types, I have received strong support from those who use the system every day.

As October approached, we prepared for a trip to Cologne, Germany to report on the bi-annual Photographic trade show, Photokina. We would be on an extremely tight deadline, and I was asked what could be done to expedite the processing of material we would be generating—i.e., could we rent some IBM's or something?

I thought it would be somewhat counterproductive to put a different machine in front of people who have found productivity and ease of use with the Amiga. So I suggested that since Commodore is rather large (and somewhat more accepted in Europe), we might be able to work something out. With the help of Commodore US, Commodore in Frankfurt, Germany arranged for three A2000's to be sent to our hotel.

At least I would have some comfort in the few off-hours knowing we could knock out all our editorial work, and maybe even have a chance to glance through the newly revived, disk-based magazine I had picked up just before I left. As I set up the first machine, I realized that we had not received any printer cables. "Oh well", I thought, "I can use an IBM-type cable there. It shouldn't be too difficult to find." I asked the concierge at the hotel desk for the location of the nearest computer store. I was instead instructed to go to a rather large department store nearby.

In the store, while searching for the computer department (fortunately "computer" is spelled the same in German), I came across a computerized book listing that was running on an A500. As I approached the computer department, I was greeted by a stack of A500's. I could not believe the assortment of Amiga titles on the book rack (hard-cover ones, too!). I found two isles full of Amiga software consisting mostly of games. Still, the Amiga selection was more than that of any other computer.

I picked up the cables and, as I paid for them, I asked the clerk if he spoke English. "A little", he replied. I asked him if he had ever heard of *Amazing Computing*. He had indeed heard of it and, while he enjoys it, he could not always find it in the local stores. He then told me that if I was buying the cables for an Amiga, I should get a special Amiga cable, which he had for the same price. If only it were this easy back home!

I quickly set up the first A2000 system and booted the Wordperfect disk I had brought with me (successfully through the airport X-ray). The screen appeared sharper than usual, and the window didn't reach all the way to the bottom of the screen. But with a simple tug on the sizing gadget, I found I now had more lines than usual on the screen. As I began typing, I found that some of the characters were not right. I hadn't figured on receiving German keyboards (the Y and Z keys were reversed, and the punctuation was somewhat different). Wait, wasn't there something in the Workbench system?

I now had the opportunity to test out one of those little Amiga niceties, the setmap command. If I wanted to touch-type, I would simply type "System/setmap USA" in the CLI, and the keys would be right where I expected them! Typing "System/setmap d" would return the keys to match the actual keyboard.

Before the show opened, I had a chance to look at some of the demos that came with the German operating system on the German Extras disk. The basic speech synthesizer had a choice of English or German pronunciation. Well, so much for the Amiga. It was time to go to work.

The Photokina is one of the largest trade shows, with 14 exhibit halls jammed with products. You can find everything from a pin to hang a picture with to a complete mobile video control center, and virtually everything in between.

(continued)

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Upon entering the exhibit hall, I was quite surprised to see an Amiga controlling a bank of slide projectors. Although these particular projectors could be controlled by almost any computer via an RS232 interface, Kindermann, the manufacturer, chose an icon-driven program on the Amiga to demonstrate the new projector interface.

Later that same morning, I spotted the familiar Commodore logo proudly displayed at the booth of a photographic distributer. In the corner of the booth were two A2000's, as well as a genlock I had never before seen. I introduced myself to the gentleman at the controls. He introduced his company as Atlantis and then proceeded to demonstrate his new software package, a sophisticated page flip-type animation program, which allows synchronized sounds on playback. His genlock is promised to be fairly inexpensive, but with more user control than the lower priced competitors. Although he was demonstrating a PAL unit, a NTSC version is planned.

A large crowd had gathered at one display. I made my way around to see what all the commotion was about. Sure enough, there was an Amiga at the center. An A2000 was generating graphics and producing crisp genlocked titles with ProVideo Plus via the Neriki image master pro-genlock from Telmak. I had an interesting discussion with the marketing director and engineer, and made arrangements to receive a sample for an upcoming *Amazing Computing* article.

On the lower level of the same hall, the Amiga again caught my eye. This time I was introduced to Softoons, an electronic line-test system from ATI (Animation Tools International). This system is a fast black-and-white digitizer and software package that lets an animator check drawings for fluidity of motion and playback the animation a few seconds later. Using the mouse, the operator can select the order of frames, repeat individual frames, and play them back to judge the motion. When finished, a printed list of the frames is available. This is not really designed as a computer animation package, but as a tool for more conventional animation systems.

Back upstairs, I ran into the real Amiga bonanza. The VideoComp company and their associates, Heinrichson, Schneider & Young, were displaying a line of Amiga genlocks and Amiga-based video systems. The VCG-A is billed as a semi-professional genlock interface for home use. It has adjustable fades and superimposing with inverse functions. The VCG-3 is intended for high-band video systems and has a 5.5 MHz bandwidth. It has all the features of the VCG-A, plus chroma keying and adjustable red, green, and blue control. A new version of the VCG-3, the VCG-3P, can accept remote-control input from video-editing units and has special output for studio mixers. Alas, only PAL versions are available at the moment, but NTSC versions may be on the horizon. I was impressed with the high-quality images these genlocks promised.

Then I saw it. It wasn't an Amiga, but it was. It was a tower Amiga—a repackaged A2000, complete with a 25MHz 68030, Hurricane board, 6881-82 coprocessors and a hard drive in a floor-standing model. The system is ideally configured for animation and runs about $7000.

An NTSC version was not available, and my request for one was answered with "it's really a simple matter"...

•AC•

Companies Mentioned

Animation Tools International
Distributed by:
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26 Bis Rue Kleber
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Bug Bytes

The Bugs & Upgrades Column

by John Steiner

As of this writing, VirusX is the latest version of Steve Tibbetts's virus crusher program. Unfortunately, just a few days ago a computer program purporting to be "VirusX 3.3" began appearing on several BBS's around the country. According to a warning posted on the major services, this version, posted as Vx33.arc, contains a bootblock virus, and possibly a trojan horse-type virus. Of course this gives Steve a major problem—if people shy away from VirusX because they fear the program might be contaminated, it will certainly be more difficult for him to successfully distribute new releases of his powerful virus-checking program.

Steve has provided a magnificent service to the Amiga community, and it is a shame that programmers as talented as him must waste their time chasing viruses around the country. I would like to see commercial software companies work out an arrangement with Steve to include VirusX on their master program disks.

While I am on the topic of viruses, I have noticed several postings regarding the appearance of viruses on shrink-wrapped commercial releases. It occurred to me that commercial developers would not be so careless as to release programs with viruses on them. I then realized that computer software dealers can open, demonstrate, and reshrink-wrap software since most software retailers have access to a shrink-wrap machine to rewrap returned software (assuming it is not defective).

A store with an infected Amiga could easily pass on a virus unknowingly to several commercial programs before the virus was discovered. And few dealers would be able to remember which disks were used in the machine before the virus detection. Meanwhile, the end user blames the software manufacturer for careless operations. In any case, the possibility of dealer-inflicted virus infection is another good reason to install VirusX in your startup sequence, and check all new disks for the presence of a virus, even commercial releases.

The top-notch shareware appointment scheduler originally known as NAG has gone commercial, as you may already know if you have seen the advertisements in several Amiga magazines. This commercial version is NAG Plus version 3.0. The program was shareware until R. L. Stockton, the program's author, and an associate decided to take it commercial under the company name of Gramma software.

If you use the original NAG and have not paid your shareware fee by this time, you will not be able to take advantage of the free copy of NAG Plus 3.0 being offered to all registered NAG shareware version owners.

The program is an excellent appointment scheduling program, and resides nicely on a hard disk. It is most useful for those whose computer is on all day. New features of the commercial version include AREXX support, Exec support, the ability to attach Notepad-type notes to an appointment or calendar, and automatic telephone dialing.

Jack Chatenay of Fargo reported a couple of small bugs related to the program's print handling. NAG Plus 3.0 has either a bug or incorrect instructions for using Search and Print together. The manual lists the procedure as:

1. Choose the beginning date on the calendar for appointments to PRINT.
2. Select PRINT.
3. Select SEARCH and type the word or phrase you want to search for.
4. Choose the date you want to stop printing appointments.
5. Select PRINT again.

When using this procedure, NAG prints properly if all appointments are in the same month. If the range of days exceeds a given month, all appointments between the start and end dates will be printed, whether or not they contain the SEARCH text.

A procedure that seems to operate properly is as follows:

1. Select the start date.
2. Select PRINT.
3. Select the date you want to stop printing appointments.
4. Select SEARCH and type the word or phrase that you want to search for.
5. Select PRINT again.

Another bug involves the printing of appointments. Should the selected appointments cross into the next year, they will not print properly. Selecting December 31 as an ending date also causes problems.

One final problem in printing is that the printer pagination function does not work properly, at least on Epson printers. It causes form feeds to be off by the number of lines already printed. The program was tested under 1.3 Workbench printer device files EPSONX and EPSONQ, and the problem was exhibited in both cases.

A parting of the ways between Aegis software and Diga! creator Rocky Stargill has occurred. Aegis announced they will no longer produce, sell, distribute or support the terminal emulator for the Amiga. Aegis will not be issuing any future upgrades to the program.

Diga support, according to Aegis, has reverted to its original author. Aegis provided his name and address: Rocky Stargill, 1532 Parkhill Dr., Gainesville, GA 30501. For questions directed to Aegis Technical Support, write: Aegis Development, 2210 Wilshire Blvd Suite 277, Santa Monica, CA 90403, (213) 392-9972.

According to a posting found on PeopleLink, there is a free update for TV Sports Football. Check your program for your current version number, and call Cinemaware to be sure your disks require the upgrade. If they do, simply send your original disks back to Cinemaware. The address is: Cinemaware Corp., 4165 Thousand Oaks Blvd., Westlake Village, CA 91362, (805) 495-6515.

Dave Haynie has been working on Disksalv again and has made version 1.32 available. Though mostly a bug-fix

(continued)

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release, several features have been added. Support for the RAM drive and hard disks, including fast file system hard disks, is now available.

Disksalv will even format the destination drive if necessary. This program is available on most information services as freeware, and is a major contribution to the Amiga community. It should have replaced DiskDoctor on the Workbench 1.3 issue. In my humble opinion, DiskDoctor should be sued for malpractice.

Progressive Peripherals and Software has announced the availability of IntroCAD Plus. Owners of IntroCAD 1.9 or 2.0 will be allowed to upgrade to IntroCAD Plus for the difference in retail prices. With a suggested retail price of $150.00 for IntroCAD Plus, the upgrade will cost the end user about $70. UltraDesign will be sold for around $400 but will not be available for IntroCAD upgrade.

Among other features, IntroCAD Plus contains multiple fonts, better text handling, layers, hatching, user-definable keyboard equivalents, script language, AREXX support, better grid handling, and better edit features.

IntroCAD Plus is another of the growing number of software releases that can use AREXX. Anything that would take several steps to complete, or that requires complex calculations, can be automated using AREXX. Expect to see IntroCAD Plus on the market by the time you read this.

Manx version 5.0 is due to be released in late Spring, meaning the end of May or early June. Their update policy is not completely firm as of this writing, but a spokesperson said those who purchase V3.6a after Feb 1, 1989 will receive the update free; all others will pay well under $100 for the new release.

According to Justin Fisher of Pixelations, Printscript has undergone a minor upgrade. Printscript is a program which takes Postscript output files and prints them on non-Postscript output devices, including dot-matrix printers and inexpensive LaserJet-compatible laser printers.

The newly released version of PrintScript is version 1.0.1. It provides PageStream and ProDraw compatibility, and fixes a few bugs as well. The upgrade will be sent to all registered owners of PrintScript. If you haven't done so already, you should send in the registration card as soon as possible. There is no charge for this update.

That's all for this month. If you have any workarounds or bugs to report, or if you know of any upgrades to commercial software, you may notify me by writing to:

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by the Bandito

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NY AmiEXPO report:

There were several prominent no-shows, and you don't have to be Nostradamus to predict that one or more of them will not be functioning as an independent company before summertime is here. The Bandito even heard that feelers were going out to other companies at the show, but no deals were made. The products will without doubt end up in good hands eventually, but there may be a period of disruption. But in the end, none of this should affect your product-buying decisions. Do you think that just because a company sticks around, it's going to keep updating its products? Not necessarily, if they use freelance programmers, and most companies do. If the freelancer isn't kept happy, he goes off to do something else, and the product is never upgraded. There's no certainty anywhere, so buy the product if it does what you need, and be happy when they come out with an upgrade.

Also at the show ...

NewTek showed Digi-Paint 3 for the first time. What happened to Digi-Paint 2? They skipped a number, didn't they? In any event, the Jim Sachs interface and the sheer speed drew a lot of attention. The HAM Paint Wars should be raging in earnest by the time you read these words, and advertising salvoes should get pretty thick by the end of spring. The NewTek booth also attracted famous magicians Penn & Teller, who hung around watching Video Toaster do its tricks (maybe they'll have something new for their act).

For the many video professionals who came by to see the Toaster, NewTek had a scope hooked up to the Toaster so the Doubting Thomases could check out the signal. More than one went away looking for the hidden wires connecting it to a $100,000 machine, but it was just a little old Amiga. Let's see them do that on a Macintosh. The Bandito heard one NewTekker say that they've exiled their engineers to a mysterious place called Alcatraz, not to be released until the Video Toaster is finished. No one knows where the place is, not even most of the NewTek employees. They've even got a false storefront set up to keep out nosy passers-by. Of course, if they don't finish the Video Toaster soon, they may *need* a good hideout. The most asked question, of course, was when? Reading between the scan lines, the Bandito figures this summer.

Progressive Peripherals showed off a 256 gray scale scanner, which should go over well with desktop publishers. With that many grays, the image looks just like a photograph, which means desktop publishers can save themselves some money on photography. Some hot new Sculpt demos showed off the Amiga's ray-tracing power while they demonstrated that a good demo is its own reward, to judge by the gawking crowds.

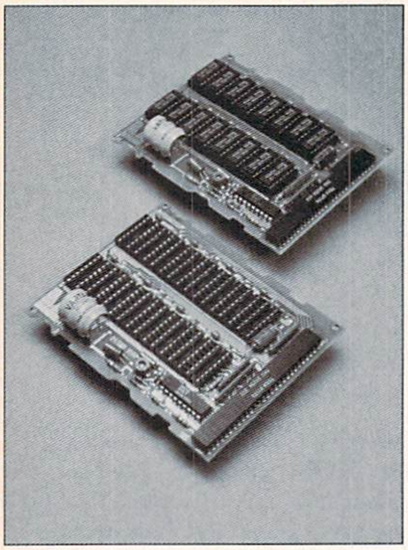
And of course, there were a zillion games all beeping and flashing and zapping, and the Bandito just doesn't have enough time to play them all. Maybe the Bandito should get several Amigas to play multiple games simultaneously. There were the usual round of after-hours parties thrown by insiders, and the Bandito wandered through a number of them, picking up free beer and tasty tidbits of information. (This column has to come from somewhere, you know.) It's really amazing how thin those hotel doors are, and the old glass-pressed-against-the-door trick still works for picking up interesting conversations. Too bad the hotel didn't have any eaves, or the Bandito would have dropped them.

The latest word in the Atari Games vs. Nintendo punch-out

Atari Games has expanded its suit against Nintendo. The expanded suit alleges Nintendo's technology infringes Atari's basic video games patents filed in 1984 (as you may recall, Atari pioneered the home video game market way back when). In its suit, Atari Games, along with its subsidiary Tengen, asks that Nintendo be forever enjoined from conducting business in the United States. Now this demand goes a bit beyond the normal "stop selling products that infringe on our rights". It's a new standard in legal battles—"don't you ever sell anything over here ever again!" Of course, no one expects such an injunction to be granted, but you never know what a judge will do.

Atari Games also alleges that Nintendo has sent letters to major retailers threatening legal action if they buy game cartridges from Atari Games. In other words, Nintendo has been trying to intimidate retailers that carry Atari Games software. Nintendo's attorney has been sending letters to software retailers that say, "You should understand that it is Nintendo's intent to vigorously pursue those who infringe the patent. If your company handles products which infringe Nintendo's patent or other intellectual property rights, Nintendo intends to avail itself of the full range of its legal remedies." Another letter

(continued)



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demands that retailers provide an inventory of their software and a complete history of all prior sales of the software.

If Nintendo wins this case it could set a precedent, giving computer hardware manufacturers the right to control who sells software for their machines. That's not a friendly idea. Imagine if Commodore controlled all the software written for the Amiga, and it was all as bug-free, user-friendly, and delivered on time as, say, Kickstart and Workbench 1.3. (It's OK, the Bandito was only joking. Put away that assault rifle, now.)

By the Bandito's count, the monetary demands made by both sides are around half a BILLION dollars. As former Senator Proxmire said, a billion here, a billion there, and pretty soon you're talking real money. It's gonna get nastier before it gets nicer. What does it mean to the Amiga market? Well, it's making the 16-bit video game look better all the time, if only to avoid the legal hassles of the current technology. Commodore has a real opportunity with their Amiga 250 video game, and they may well introduce it this summer (June CES is a good bet). One of the big attractions of the Amiga 250 over other 16-bit video game designs is the large installed software base of Amiga games. The big question Commodore is wrestling with is the basic memory configuration of the machine: 256K, 512K or 1 megabyte? Before you sneer at 256K, realize that the machine won't necessarily have to support a disk drive, keyboard, system software, etc. For cost reasons, the machine probably won't be too expandable, though there are some who argue for making it fully expandable into an Amiga 500.

Lotus, the software giant, has reached a secret agreement with Emerald Intelligence over rights to the name Magellan. Lotus was surprised to find the name already in use in the Amiga market for expert system software. The Lotus product searches for files on a hard disk and is strictly for the IBM PC market—but that's still an infringement. Lotus immediately went into heavy negotiation mode when they found that the Magellan name had already been trademarked, possibly because Lotus had already invested heavily in the name and was unwilling to just give it up. The Bandito was unable to determine the amount of money involved, but you can bet Emerald Intelligence got a nice piece of change for the rights—enough to pay for a nice dinner and a few years of software development, at least. Lotus gets to use the name in the IBM market and Emerald Intelligence gets to keep its name in the Amiga market.

While we're in the merry world of legal maneuvering, our dear friend Apple has been hit with a trademark infringement lawsuit by the Beatles' Apple Corps. Seems they had an ultra-top-cosmic-secret agreement back around the turn of the decade that gave Apple Computer rights to use the name Apple Computer, but only on non-music products. Well, the Apple Corps people claim that Apple has violated the agreement by selling computers with sound chips in them (like the Apple IIGS and the Macintosh line), and selling a MIDI interface and miscellaneous other products. The Beatle company really got mad when Apple Computer tried to squash Apple Corps. trademarks in Europe. So now the matter's ending up in court. They'll probably settle for a tidy sum of money and some disclaimers on the hardware. How about "This computer isn't good for any use involving music?"

Apple is busy on yet another legal front. They won a preliminary victory over Microsoft and HP in the dispute over Microsoft's Windows 2.03. The court ruled Microsoft did not have the right to create Windows 2.03 based on their 1985 agreement with Apple over the "look and feel" of the system software interface. So now they go to the mat over whether Apple has the rights to the windows, icons, and mouse interface, or whether it's not copyrightable at all. You can bet Commodore is watching this battle with interest, because the Workbench could be another target. Yeah, it looks different to you and the Bandito, but who knows what a lawyer thinks. Hmmm, that could be the reason for all these lawsuits. Maybe Apple's trying to design a legal computer...

An unpleasant reminder of the piracy problem: An early version of DeluxePaint III was posted to bulletin boards by one of the beta testers and consequently has found its way into the hands of some unscrupulous users.

Some retailers complained they won't be able to sell the product since people already have it. That's not really true because what those users have is an early version without all the features and with several bugs. If you have one of these copies, wipe it out and go buy one. And if you know anyone who is posting someone else's products to bulletin boards, stuff them into a Trashcan and then select Empty Trash. The Bandito is tired of pirates spoiling the software market for the rest of us. Remember the Atari! That market was destroyed by software piracy. What developer would create new products if they can't be sold? The Bandito wants more and better software, so the pirates have got to go. Hangin's too good for 'em. Reformat them and send them to work for IBM.

Wow, look at all the genlocks—they breed like laboratory mice. Let's see, according to the Bandito's count, there's at least 10 of them out there, and more on the way. Prices range from under $200 to over $1500. Why so many? Well, the Bandito hears that the Amiga now holds a 60% share of the video titling market. That could explain all the interest in genlocks.

By the way, the new Broadcast Titler software from InnoVision Technology looks hot. It has anti-aliased hi-res fonts that look super. For comparison, the Bandito found the spec sheet on a "low cost" titler box, the Knox K40, made especially for the video market. This wonder of high technology sports 32 colors, 2 (count 'em—two) different fonts, with 9 different roll and crawl speeds and an incredible 16-page memory, "housed in attractive desktop keyboard". All this can be yours for a mere $2,495. Is it any wonder the Amiga is gobbling up the titling market? Somebody should tell those people at Knox about the Amiga, and maybe let them know about the invention of electricity, too.

The Bandito hears that one Amiga accelerator card maker better slow down to let the cash flow catch up. You got to have enough money to build the hardware before you can sell it. Mediagenic's Activision division (has a nice ring to it, doesn't it?) is working hard to create a first class product line (which means getting rid of most of their old titles). The results of their efforts won't be apparent till Christmas. They've lined up some of the best talent in the business to produce their games, paying premium prices.

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Meanwhile, they've revamped their staff and are still looking for a few good people. It's a race to see if the stockholders can be patient long enough; they've waited a long time for the price to get out of the cellar. Activision will concentrate on the action/arcade/adventure games; Gamestar will produce the sports games; and Infocom will produce the roleplaying games. The nice thing about all this is that the Amiga is becoming a more important machine for their efforts. The feeling is that this year the Amiga will move into the number two slot for game sales behind the mighty MS-DOS crowd, outpacing the aging C64.

Amiga is gaining favor as a game development platform among major software publishers (Activision and Accolade have both recently announced this. Of course, Cinemaware has been using the Amiga as their design platform all along). This is partly because Amiga entertainment software sales are booming, and partly because porting to the IBM is relatively easy. That is, if the game doesn't push the Amiga hardware too much—the more C code, the better for porting, but slower graphics. This means more games for our favorite computer, but they probably won't push the hardware as much since they're headed for the IBM.

Well, the companies that were firing people after Christmas are now hiring 'em back. As usual, with summer approaching and the products coming fast and furious, the big software companies are looking for more people. It's cyclical and, as the big software houses get bigger, there will be a constant inflow and outflow of people. The hottest demand is for game programmers, who can basically write their own ticket if they've demonstrated they can produce (having a product on the market is the best way).

An Amiga laptop? Well, if an Atari ST laptop exists in prototype (and it does), why not an Amiga? Color laptops are coming; Zenith has a prototype of a CGA (4-color) screen, as does Toshiba. The technoids predict color screens will be widely available in the marketplace in two years. And did you know that Commodore once had plans to introduce

(continued)

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a laptop C64? True, but it died (partly because there were no color screens available then). Imagine being able to play *Falcon* on a laptop Amiga while flying across country. What would the stewardess think?

How will the Amiga architecture move into the future? The Bandito has gazed into the future to five years from now, and here's what it looks like. Commodore will probably not do their own new chips, but instead go with TI 34020 or the like for a more powerful blitter. Not because they can't design a chip, but the thinking is that it's better to follow a larger industry standard for high-powered blitter and get more software support from a wider range of companies. If UNIX becomes a standard, the Amiga may merge with the mainstream, which explains all the emphasis on the Unix Amiga.

Commodore figures on approaching the whole low-cost workstation market from left field, and it just might work. Look for them to work with an industry standard chip architecture for future RISC computers (see their Transputer stuff). Does this mean that someday you'll be running your Amiga software under UNIX? Maybe...

More music software for the Amiga is being ported from ST and Mac, now that the ST is evaporating and the Mac software makers are looking for another market. The Amiga is also becoming more popular among musicians, but not because of its internal music-generating prowess. For a professional, it's still not good enough. No, what's attracting buyers is its low cost compared to the Macintosh, as well as the Amiga's growing power in desktop video.

Video is becoming more and more important for musicians as part of their stage show and in creating music videos, so the Amiga is a natural for them. *Texture* is still the choice of the pro, though other challengers are aiming to knock it off. Dr. T has ported his whole line of ST software to the Amiga, and there's a lot of power there. And Music-X still waits in the wings.

Things The Bandito Would Like To See Dept.

Games that would happily live in the background while real work was being done. Of course, everybody wants to make games that use all the power of the machine. But there are some games that don't have to, like strategy games or card games and such. If *Shanghai* or *Battle Chess* would multitask, the Bandito could pretend to get some work done and still have a game available for a quick break. Come on, *Shanghai* doesn't really need full power from the Amiga, does it?

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If you cannot get your game to multitask, how about politely starting up the Workbench when you quit the game? The Bandito really gets annoyed at having to reboot the machine when the game is over. While you're at it, make the game installable on a hard disk for the growing number of hard disk owners out there. The Bandito hopes to get one someday, so the games should be ready for it. Oh, and check out all those old games to make sure they run under 1.3. Sure, they're supposed to, but do they all? The Bandito hears that some don't. One of the few drawbacks of having more Amiga models with different configurations is that it makes software testing more difficult.

Atari Corp. (corpse?) has announced they're getting rid of the Federated Group, their chain of electronics retailing stores. Federated has been a money-loser for Atari from day one, and has been instrumental in helping Atari post large losses for the year ($84.8 million for 1988). Atari claims part of the problem was that they paid too much for Federated in the first place. So they are suing Federated's former owners, claiming that they overstated the value of the company by $43 million dollars.

Meanwhile, Atari is having serious market share problems with their line of computers and video games. The European market, once their stronghold, is now weakening under the Amiga onslaught. Atari has finally started selling their PC compatibles in Europe, but no word on when they might appear in the U.S. They showed off their new PC Folio, a hand-held MS-DOS computer, at the Hannover Fair. Again, that will be shipped in Europe but not in the U.S. No further word on their "advanced" ST that would supposedly compete against the Amiga. They'll probably just give up on the ST as a lost cause and try to make it in the IBM compatible market. Maybe they'll find a niche somewhere. How about making TI 99/4A clones?

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Virus_Texts (dir)
Various text files from various places (Amicus #24, PeopleLink, and elsewhere!) describing the Virus(es) and people's experiences and their recommendations; TVSB "The Virus Strikes Back": satirical text describing future efforts to rid the universe of the dreaded (silicon) viruses! Interview with the alleged SCA virus author!

WB_VirusCheckers (dir)

VirusX3.2
Runs in the background and checks disks for viruses or non-standard boot blocks whenever they are inserted. (Recognizes several viruses and non-standard boot blocks. Removes virus in memory. Has a built-in "view boot blocks" & other features.)

Sentry
Revision of VirusX1.01 in Lattice C.

ViewBoot
Highly active mouse-driven disk and memory virus-checker which allows you to look at the pertinent areas (useful in case you supect a NEW virus!)

VRTest3.2
Watches memory for viruses; will alert the user and allow their removal if found. Can check & INSTALL disks, etc.

CLI_VirusCheckers (dir)

AntiVirusII
From The Software Brewery (W. German). Disables a virus in memory.

Clk_Doctor3
Corrects problems with the clock (caused by malignant programs, perhaps not really a "virus") (A500 & A2000)

Guardian1.1
Checks for attempts at viral infection at boot! Allows you to continue with a normal boot (if desired). Includes a small utility program to permanently place the program on a copy of your kickstart disk.

KillVirus
Removes (any?) virus from memory.

VCheck12:
Checks for SCA virus on disk or in memory.

VCheck19
Checks for any virus or otherwise non-standard boot block.

VirusKiller
A graphically appealing and user friendly program by TRISTAR.

Boot-Block_Stuff

SafeBoot2.2
SafeBoot will allow the user to save custom boot sectors of all your commercial disks and save them for such an emergency. If a virus somehow manages to trash the boot sectors of a commercial disk, just run SafeBoot and it will restore the boot sectors, therefore saving your disk!!

Virus_Alert V2.0.1
Yet another anti-virus program with a twist. Once installed on your boot disk a message is displayed just after a warm or cold boot notifying the the user that the disk and memory are virus-free, and forcing a mouse-button press before continuing.

BootBack1
Saves and restores boot-blocks. Runs from CLI only.

***Antivirus** aka AVBB*
Includes SEKA assembler source.

XBoot
Converts a boot-block into an executable file, so you may use your favorite debugger (Wack, Dis, ...) to study it.

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(***Deluxe Paint III review***, *continued from page 16)*

As an extremely brief introduction, the following steps will demonstrate the most basic method for animation creation with DeluxePaint III.

1. Use the Set # command from the Anim menu's Frames submenu to set the number of frames. This places you in the first frame, as indicated by the 1/40 at the top of the screen.

2. Draw the first frame of the animation.

3. Advance to the next frame by pressing the 2 key.

4. Draw the next frame. Use the 1 and 2 keys to flip back and forth to compare frames.

5. Repeat Steps 3 and 4 until all the frames are finished.

6. Press the 4 key to view the final animation.

Of course, the program offers a variety of tools to ease animation production.

The Anim Menu

While the Anim menu lets you load and save animations, the first command of real interest here is Move, which brings up the requester shown in Figure 1. This section of the program lets you create three-dimensional animations with custom brushes, either within a frame or over a series of frames. Move translates objects in the X, Y, and Z dimensions—that is horizontally, vertically, and in/out, and rotates them about the same axis. Also worth mentioning are the Ease In and Ease Out settings which allow gradual acceleration and deceleration during brush movement.

To try to explain the Move command fully would be to (foolishly) attempt to rewrite the manual. Just one of the many possibilities, however, is to have objects flying toward the viewer, tumbling on various axes. It is important to remember that, convincing though the illusion may be, this is not true 3D animation. The program simply manipulates 2D bitmaps.

The Anim menu's Frame submenu lets you set the number of frames, insert a new frame after the current one, delete frames, and copy the current frame to all frames. You can move between frames with the keyboard number keys, which let you maneuver forward, backward, jump to the first and last frames, and play the animation forward, backward, or both. These commands are also available from the Control submenu, which also lets you set the frame rate and the range of frames to be included in the current animation.

The Animbrush submenu gives you control over the animbrush, a "multi layer" custom brush which contains a sequence of images, only one of which is visible at a time. This is what gives DeluxePaint III cell animation capability. To create an animbrush, you set the number of frames, then draw each step of the animbrush in the same place in each consecutive frame, or let the program draw it for you using the Move command. The Pick Up command lets you pick up the animation as a single brush.

Other Animbrush commands let you save and load brushes, step forward or backward through the sequence, and jump to a particular cell number. You can also set a duration for the animbrush faster or slower than that of the frame rate, and cause the cells to proceed forward, backward, or Ping-Pong style. Unfortunately, there is no way to edit individual cells of an animbrush, or to record the sequence.

Of course, none of this will make much sense until you understand what you can do with an animbrush. And here, as with many other aspects of the program, imagination is the only limit. Basically, each time you place a copy of the current image of the animbrush, it automatically advances to the next image in the sequence. You can paint with an animbrush within a single frame or over a series of frames. You can create paths using the line tools in conjunction with the spacing settings. Or you can simply paint freehand "across" frames of animation by holding down the left Amiga key—the program advances to the next frame every time you place the brush.

You may recognize this concept if you've used Gold Disk's MovieSetter, a more dedicated animation program. There is a slight parallel between the animbrush and MovieSetter's Set, or sequence of cells. The most significant difference is that a placed Set in MovieSetter—a Track—remains an independent construct that can be moved, edited, or removed. However, once you've placed an animbrush in DeluxePaint III, it becomes a permanent part of the animation. And while we're on the subject, another significant difference between the two is that DeluxePaint III lacks MovieSetter's respectable sound capabilities, making no use of sound at all.

Summary

There is not enough space in this magazine to do justice to DeluxePaint III, the undisputed best new graphics program of 1989. I mustn't neglect to congratulate manual author Hal Jordy, who did a superb job with the documentation. While the reference section is complete (with a great index, no less), the bulk of the 240 pages is devoted to a series of instructive tutorials that introduce most of the program's capabilities in a painless manner. In fact, I enjoyed following them!

So if you want the fastest, most user-friendly, and most "painterly" Amiga paint program, and don't need HAM mode, DeluxePaint III is the one to get, even if you haven't any interest in animation. Consider the animation a bonus, and more than adequate for experimenting with cell animation and home video.

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•AC•

POWER DISTURBANCES

...or Why Every Hard Drive Needs a UPS

by Steve Bender

Most people don't give a second thought to the power their computer is attached to and dependent upon. In the 1960's and 70's, the days of mainframe computers, special dedicated power lines and banks of line-conditioning capacitors adjusted for both the power draw and power factor of these electronic monsters. These machines were even equipped with their own air conditioning systems. But now, although micros occupy millions of desks throughout the country and we are more dependent on them than ever, we give minimal thought to the power coming into our machines. Gone are the dust-free, climate-controlled conditions for computers. Just plug it in and it works. Well, most of the time...

Power from the Mickey Mouse Lighting and Power Company often arrives with lapses like voltage spikes, surges caused by lightning, glitches from equipment cycling, grid switching, and varying demand. Other problems include brownouts and dropouts, likely to occur during the summer months. Voltage spikes? Surges? Power failures? They are pretty uncommon, aren't they?

An undetected voltage surge or spike might not cause the computer to freeze. Its effects might be more subtle, however. It might change the values of data in the system memory (RAM). When this gets saved to disk, the data or the program becomes faulty. This might not be discovered for weeks, or even months. With parts so stressed by line surges, the memory chips fail, changing data in unknown ways. Since the Amiga does not perform memory parity checking, it would seem that our machines are particularly vulnerable to this unseen type of error. How many GURU MEDITATION messages (software errors) have you seen in the past year? Some of them were due to power disturbances.

Small voltage spikes show up as line noise. Larger voltage spikes, of very short duration on the AC line, can reach levels of six thousand volts. These are easily capable of stressing, weakening, and generally playing havoc with power supply components, eventually leading to failure of the entire computer system.

Remember also that a blackout, while rare, still represents about one percent of all power line disturbances. A single two-second blackout can easily cause the loss of a hard disk, and all its data. Worse yet, a blackout may destroy that copy-protected game disk or Workbench boot disk, which may be the only copy with that new startup-sequence that took four weeks to figure out and get just right.

The devices currently available to help protect against these power line problems are surge/spike protectors, power line filters, and UPS units. Of these three protection devices, only the UPS can detect and defend against all three types of problems: surges, line noise, and voltage interruptions.

On the Computer End

The Amiga A1000 and all other micro-computers now on the market use digital IC chips which require well regulated DC (Direct Current) voltages to maintain proper operation. These DC voltages are very different from the 120 Volt AC (Alternating Current) line voltage in your house. Therefore, you must alter this 120 volts AC into the required regulated low voltage lines (+5 volts, +12 volts DC).

The device inside your computer that produces the proper voltages is the regulated power supply. This power supply can either incorporate linear (low frequency 60 Hz.) rectification circuitry, or switcher (high frequency, up to 20 Khz.) pulsating high voltage circuitry. These types of units are called linear power supply (LPS) and switching power supply (SPS), respectively. All the better computers use an SPS, for several reasons.

> *Power often arrives with lapses like voltage spikes, surges caused by lightning, glitches from equipment cycling, grid switching, and varying demand. Other problems include brownouts and dropouts.*
>
> *Voltage spikes? Surges? Power failures? They are pretty uncommon, aren't they?*

An SPS is relatively immune to the noise and garbage on the AC line. An SPS is more efficient near its maximum rated power output level. An SPS also consumes less power and produces less heat than an equivalent linear power supply. The switcher tends to be less bulky and produces less low frequency AC noise (60 Hz hum).

The single disadvantage of the SPS is much more high frequency noise (RFI-radio frequency interference/EM -electro-magnetic interference), which means that an SPS needs a significant amount of shielding. An SPS is therefore usually totally encased in either a steel or mu-metal enclosure.

Some peripherals may also have an SPS. Likely, Amiga peripherals include the higher priced multiple frequency scanning RGB (multiscan) monitors, laser printers, and the Amiga A-1020 external 5

(continued)

1/4" disk drive. Those peripherals that probably do not have an SPS include dot matrix and daisywheel printers, and anything with an outboard black box power supply.

As we have seen, all computers incorporate some form of regulated DC power supplies to insure proper operation of the TTL digital IC chips. Such devices are, quite necessarily, part of their construction. To simplify things, the regulated +5 Volt line insures that the digital chips see the proper "0" and "1" states on all pins, so the +5 Volt line is the most critical. That is because the digital IC's that make up most of the circuitry inside our computers have very little tolerance for variations in their "Vcc", a regulated power supply line. Once the +5 Volt line goes below +4.75 volts or above +5.25 volts, proper operation is no longer assured.

> *If the AC power goes out for more than three AC cycles, the regulated power supply voltages begin to sag. In the case of the Amiga, Kickstart is gone (1000 only), and programs and data in System Memory are gone*

Soon after the loss of AC line voltage, the DC regulated output starts to decay. After loss of the AC line, the time the SPS maintains its regulation under load conditions is called the holdup time or the power supply's "margin". This margin is a power reserve within the larger capacitors in the SPS that varies from design to design. It also varies from brand to brand, and from unit to unit for a given power rating. When an SPS is being used at one-half or less of its rated power level, its margin is somewhere in the range of three AC cycles, or 50 ms. (milliseconds). This varies with the percentage of full rated load that is present on the SPS when the input power is lost. All other things held constant, the holdup time on an SPS would be larger than that of another SPS if the margin is larger.

When the AC power stops with neither an on-line or standby UPS, after the holdup time (expressed in milliseconds) has passed, the previously regulated voltages in the SPS droop. The computer hangs, the CRT goes blank or freezes, and data in RAM memory is lost. If a floppy disk (or hard disk) was being written to, that disk probably becomes unusable.

UPS Units: What are They?

An Uninterruptible Power Supply (UPS), On-line UPS, Backup Power Source, Standby Power Supply, or Standby UPS units are terms used to describe various forms of emergency power systems. These systems "take over" from the normal electrical utility system, either on a full-time basis or in the absence of the normal power generation, to protect data and electronic circuitry.

The Uninterruptible Power Supply (UPS) is a term synonymous with large on-line units rated in KVA (kilo volt/amperes) and 10's of KVA's. These monster backup units produce sine waves, and cost tens of thousands of dollars. They are suitable for industrial powering applications, and mainframe computers. More frequently, UPS now applies to all types of battery backup power systems.

An On-line UPS is always powering the equipment attached to it, from its internal or external battery source. With few exceptions, these expensive units produce pure sine waves, and resemble a miniature power station. When normal AC power is available, it charges the battery and powers the inverter, which powers the equipment. When the AC power goes out, the UPS continues powering the equipment, using the battery. Initially, the AC line power and the battery were parallel, so nothing changed or switched over. Without AC power, the battery runs down, and a limited amount of time is available before everything grinds to a halt, unless the AC power returns. The failure rate of On-line UPS units in the past has tended to be higher than that of similar Standby UPS systems.

The Backup Power Source, Standby Power Supply, or Standby UPS are the units that concern us here. These are more moderate in size, capable of 250 VA to 750 VA (Volt/Amperes). These emergency power supply boxes approximate the size and weight of the microcomputers they are designed to be used with. They are normally passive devices, except for line filtering/surge control, or power control functions. In other words, they wait, and then switch to battery backup mode when a power outage or momentary interruption is detected. This switching process takes a finite amount of time, usually 2 to 8 milliseconds.

Most of the UPS units reviewed in the second and subsequent parts of this series are switching, standby, or backup units. Most of these ten units use PWM (Pulse Width Modulation) circuitry and Switchmode™ transistors to produce their backup power in the form of square waves, or some variation often called modified square waves or stepped waveforms. In the actual tests, our scope checked each waveform produced under computer load conditions by the UPS units under battery backup conditions.

Two of the brands tested (Meirick, DRS) produced recognizable square waves (See figure one: DRS-350-Square Wave) from their inverters. Several others (Cuesta, Intertec, Kalglo, and Relax Technology) produced a stepped waveshape indicative of PWM, which more closely resembles the area under the curve of a sinewave (See figure Two: Cuesta 400-Pulse Width Modulation Waveform). Three of the ten UPS units tested (C-Cor, Emerson, and SAFE) produced well-rounded, fairly clean AC sinewaves under battery backup conditions (See figure Three: SAFE 500 - Sine Wave). Figure four is the normal AC line filtered by the SAFE UPS. Only one unit tested (Emerson PC-ET) is an On-Line UPS unit. Of the three units which produced sinewaves, in terms of waveform purity, the Emerson had the purist waveform, followed by the SAFE, with the C-Cor being somewhat more distorted. The list prices of the switching UPS units reviewed here varies from about $350 to $1000. Some are available discounted from distributors.

Functional Considerations

Here is how the standby units work. The UPS plugs into the wall, and the computer and CRT monitor plug into the back of the UPS. When the UPS is turned on, it charges its internal battery or batteries. (Some even charge whenever they are plugged in.) Then the UPS "stands by", monitoring the AC line. When the AC power droops or vanishes, the standby power supply automatically switches the computer (within a small fraction of a second) to a battery-powered AC inverter system. Luckily, the square wave or stepped waveform output of most UPS units is totally harmless to the SPS found in today's microcomputers. Some manufacturers claim that an SPS actually runs cooler, and more efficiently, from a square or stepped waveform compared to operation on sinewaves provided by the power company.

All UPS units designed for use with microcomputers use Gel Cell batteries. There are really only half a dozen major suppliers of such batteries. Most of the ten UPS units tested used Gel Cells from one of the five major suppliers (Power-Sonic, Yuasa, Panasonic, Eagle Power, and Elpower). The only UPS which did not contain batteries from one of the major suppliers was Intertec.

Information about the proper care and feeding of Gel Cell batteries is most often omitted from the technical information provided by the manufacturers who use them. These batteries may not reach their full capacity until they are fully charged, then fully discharged (cycled) five or six times.

To avoid premature battery failures, you should do the following: Calculate the power your computer system draws by adding up the VA or watts on the labels, or from the specification sheets, as an estimate. If you calculate the draw to be about 200 watts, test the UPS unit by powering two lamps, each using a 100 watt light bulb. Pull the wall plug on the UPS and record how much time this load runs on battery backup. Test it in this manner periodically. Get familiar with the amount of time you can expect the UPS unit to operate. This insures a reference against which you may detect a change for the worse.

Also, to help condition the UPS battery, put the system on the UPS, park your hard disk, and pull the plug. With the computer as the load, this tests the UPS for proper backup operation. Some units (Kalglo LS-250, LS-500, SAFE SW-500) even provide the user with a TEST position on the front panel for this purpose. This allows testing the battery without pulling the plug. This is better than pulling the plug since the system ground reference is not broken when using the TEST switch.

Do this twice a year, or every month if you wish. Most users will never test the UPS, much less cycle the unit (charge then discharge to near depletion) half a dozen times to keep it working at peak efficiency. Most of the UPS manufacturers' instructions do not even hint at this or any other procedure as being part of "proper maintenance".

After such a test to depletion, it is best to operate the UPS for at least 12 hours on a minimal load. Turn the computer and monitor off, and leave the UPS on overnight. This way you won't get caught with a half-charged battery. You may wish to initiate this type of test twice or three times during a single week when the unit becomes two or more years old. The life expectancy of the UPS batteries varies from two to five years, depending on the method used to charge them, and who you talk to.

After testing the UPS batteries to depletion on your test load or computer system, always charge them for 12 hours or longer before the next depletion test. Most UPS units charge up in 6 to 12 hours. If you find that, with the same load, the backup time drops off by 30, 40, or 50 percent from one test to the next, or from the results obtained six months ago, you have a weak or dying battery. Again, this type of test should be done every six months or so.

Two other conditions can affect battery life. Leaving a UPS unit powered ON and disconnected from the AC Line for even 24 hours could kill the batteries. Leaving the unit in the closet, in the box, or on the shelf without charging for more than six months may adversely affect battery life, especially at elevated ambient temperatures. This applies to every UPS, since they all use Gel Cell battery technology.

Most UPS units charge the batteries only when the unit is powered ON. This leaves the system somewhat vulnerable to a power outage just after turn-on if there were several prior days of disuse. In that case, the batteries may not be fully charged. Several manufacturers get around this by incorporating charge circuits that always trickle charge the UPS batteries (24 hours a day) when it is plugged into the wall socket. This keeps the batteries in peak charged condition. The UPS manufacturers that do this

(continued)

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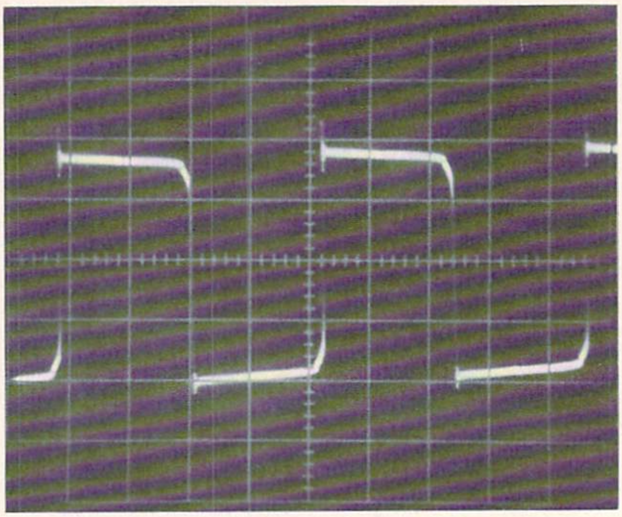

Figure One (left) *DRS-350-Square Waveform*

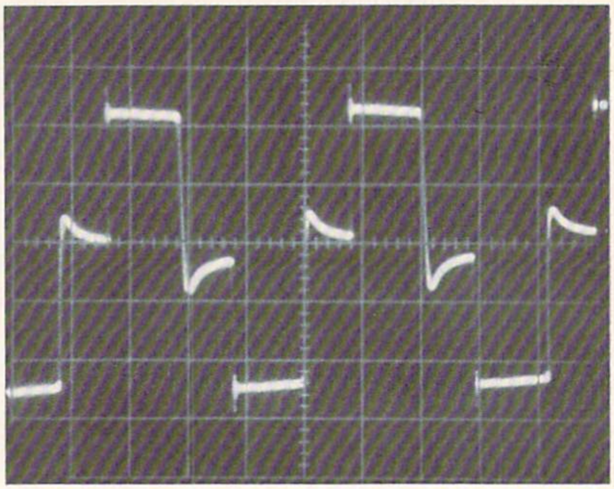

Figure Two (right) *Cuesta 400-Pulse Width Modulation*

include SAFE and Relax Technology. This process has a rare, but potential, problem.

I had one isolated incident about a year ago with a UPS that always trickle charged, where either the battery charging rate was set too high, or one of the batteries cells had a defect. The result was that one of the batteries started to leak after about 14 months. It made a bit of a mess inside the unit, since the Gel Cell batteries contain sulfuric acid. This acid is not free, but part of the gelled electrolyte, a heavy paste-like substance. Still, it is fairly easy to tell whether the batteries are leaking as they will exude a potent smell similar to that of rotten eggs.

The Gel Cell poses no imminent danger unless it is leaking so badly it is coming out the side of the UPS unit. Testing the UPS on a regular basis for weak or dying batteries is the best way to avoid a leaking battery. I've had three Gel Cell batteries sitting out on my bookshelf for the past four years. If not needed in the UPS, they make great doorstops. Intact, they really are not hazardous. Just don't attack them with a knife.

Why Every Hard Drive Needs a UPS

Our "60 cycle" AC power line changes its polarity 120 times per second, or every 16.67 milliseconds per complete AC cycle. Usually, the Switching Power Supply inside a microcomputer has a "Holdup Time" of about 50 ms. under normal operating conditions. Therefore, if the AC power goes out for more than three AC cycles (about 50 ms.), the regulated power supply voltages within the computer begin to sag, causing the computer to hang. In the case of the Amiga, Kickstart is gone, and programs and data in System Memory are gone. If you have a hard drive (which spins at 3,600 revolutions per minute), that device has now been spinning for over six revolutions without power, and it is beginning to slow down.

Normally, the "Flying" read/write head of a hard drive rides several microns above the magnetic media where data is stored. It normally never contacts the platter in the data area while the platter is spinning. The flying head technology depends on a constant updraft providing a cushion of air (from the revolving media) to keep the head aloft. The head should be moved to a dedicated "parking zone", either manually or automatically, before power is removed from the rapidly spinning platter.

Most of the hard drives we can afford have a platter coated with an iron oxide surface. When the platters of a hard drive slow down unexpectedly while reading or writing data, the supporting cushion of air is lost. This is the most likely scenario for a hard drive

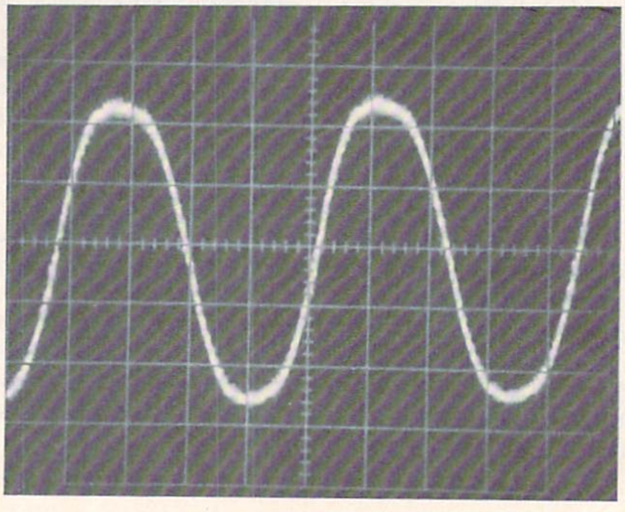

Figure Three (left) *SAFE 500 - Sine Waveform*

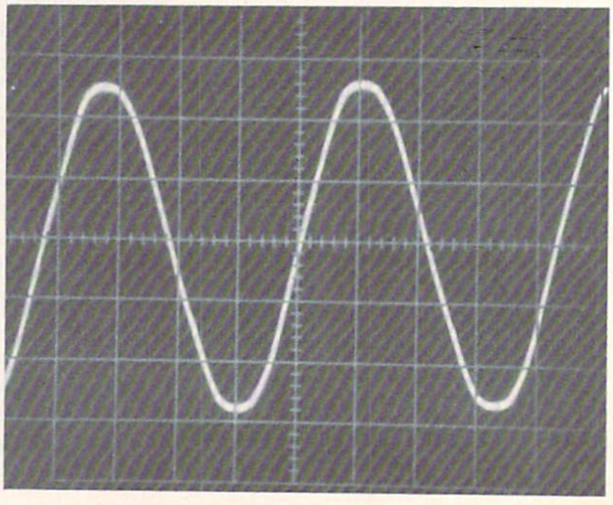

Figure Four (right) *Normal A.C. line filtered by the SAFE UPS* crash, other than physically abusing the drive. When the cushion of air supporting the flying head is lost, the head will likely come crashing down (it need only drop a few microns) to the oxide surface. The read/write head is quite massive compared to the particles of media holding the alternating positive and negative magnetic regions that comprise the data on the disk surfaces.

If the directory was being updated at the time of an unscheduled drive shutdown, the entire drive can be left unreadable. Note that this type of crash does not mean physical damage has made the entire drive useless. The dreaded NOT A DOS DISK error is a likely result of any such head crash.

The net result of the read/write head impacting the thin iron oxide layer (in the data area) is physical damage. It can also cause the head to bounce up, down, and sideways. After the initial impact, the head can bounce to other areas or sections on the disk, gouging out the media, often destroying dozens or hundreds of sectors, and thousands of bytes of data. This physical damage to the surface of the media can be extensive because the platter is still spinning at many RPM's. With a head crash involving some gouging and physical damage, the loss of part or all of the data is almost certain, and bye-bye hard drive. So, a sufficiently violent head crash can cause physical damage, leaving the entire drive unreadable, unusable, and unrepairable. In such a case the hard drive must be rebuilt.

In today's market, where hard drive prices are a fraction of what they were three years ago, rebuilding a damaged hard drive is a questionable decision. Rebuilding always requires Clean Room Facilities, and it is somewhat labor intensive. If you have a crash, and the drive starts to sound like scraping fingernails on a chalkboard (or worse), expect to spend big money to get it rebuilt. The price can be 50 to 60 percent of the cost of replacing it with a new drive of similar capacity. Often it is better to just buy a new one if it is less than a 40 MB drive. Of course, it is best not to let it crash in the first place. If a UPS is protecting your computer system, you have provided the first line of defense against ever having a crash. So, buy a UPS, and save a hard drive today!

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Technical Terms

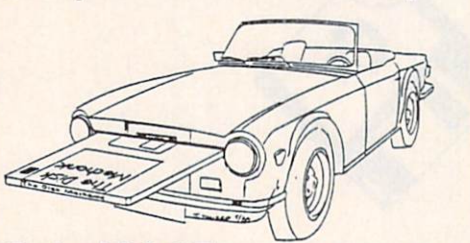
That explains why the switching type of UPS always claims a very short AC line voltage to battery transfer time. This transfer must occur well before the holdup time of the SPS is exhausted. The power supply must not be without an input power for too long, to prevent either glitches on the DC voltage output lines, or deregulation. The AC line to battery transfer time of all the switching UPS units tested here falls into the 2 to 10 ms. range. That means that typically 4/1000ths of a second (ms) after a loss of the AC line is detected, the computer's SPS is operating off the battery-powered inverter supply inside the UPS. Battery operation continues until either the UPS battery is depleted, or until the normal AC line voltage is restored.

Upon detecting an actual power outage, or voltages in the brownout range, a UPS takes over as the primary power source. Technically, the transfer from the AC line, to the battery inverter is initiated by an AC "Zero Crossover" detector. This circuit and its associated opto-isolator detects the fault in the AC line in nano-seconds. That triggers a power relay with heavy duty contacts, which switches the AC load (your computer) to the battery/inverter subsystem. As the margin of the SPS runs down, the UPS begins to supply a reasonable simulation of the AC line. Therefore, as far as the computer and your data are concerned, normal operation is maintained.

Load ratings for UPS units can be either in watts (a measure of power), or VA (Volt/Amperes). Watts more commonly refers to a resistive power consumption, as used by incandescent light bulbs, or actual DC powered circuits. On the other hand, VA is more appropriate than watts for an AC line powered computer because the SPS has resistive, capacitive, and inductive components which reflect back on the AC line.

Simply stated, an SPS as a load has an attribute known as its Power Factor (pf) which is a number between 0 and 1 (typically between 0.6 and 0.8). The Owner's Manual for the Kalglo UPS units

(continued)



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Sample TuneUp benchmark of some standard 3.5" disks:

Volume Name	TuneUp	BEFORE	AFTER	IMPROVED
Workbench 1.3	3:30	4.85	2.70	79%
Digi!	3:45	9.44	5.22	80%
WordPerfect	4:42	12.36	5.37	130%
SuperBase	3:37	19.39	9.66	100%
data	1:43	14.30	4.68	205%
archives	3:40	28.43	9.52	199%

* Times given are the average of three runs on a standard A2000 internal floppy drive. The TuneUp time is the time required to process the disk (in minutes and seconds). The BEFORE and AFTER times are the time (in seconds) required to get a directory of the disk. The more use a disk has had, the better the improvement!

Demo disk Available; call for details.

DiskRepair: With DiskRepair it is possible to recover accidently deleted or discarded files, salvage files from damaged disks, and reconstruct a corrupted hard disk. DiskRepair works with hard and floppy disks, and is compatible with the Fast Filing System.

WorkShop: For the expert user, the disk WorkShop is a full featured disk file and block editor. Examine and modify disk files, search for viruses, and change menus or requesters in popular programs.

The Disk Mechanic also includes a dozen small CLI based utilities to make managing your disks easier. We are now shipping version 2.5 with full support for Amiga DOS 1.3 and the Fast Filing System. The Disk Mechanic is not copy protected.

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defines power factor as "the ratio between the energy used by the system to the energy required by the system to make it operate properly". A light bulb produces both light and heat, using all of the energy put into it. Thus, its power factor would be 1, and its watts and VA would be the same. Again, simplified, VA means dividing the power (watts) by the load power factor, (pf) - a complicated mathematical equation. The required input power in watts divided by ~ 0.7 is VA for the SPS in our microcomputers.

Real Life Examples

To properly backup the 200 watt SPS found in the Amiga 2000 under its maximum load conditions, we would need more than a 200 watt UPS. We can calculate the size of the UPS needed. The A-2000 SPS can be assumed to be about 75 percent efficient. Therefore, we need an AC Line input of 267 watts (200/.75) to get full DC power (200 watts) out. The UPS needs to supply 381 VA (watts/pf), 267/.7 in real life Volt/Amperes. In other words, a UPS rated at 400 VA is needed. These values are very conservative and take into account that the starting-up power surge of a 200 Watt SPS can certainly be 30 or 40 Amperes (at 115 volts) for up to 30 to 50 ms. That is why the lights often blink when a computer system, RGB monitor, or laser printer is first turned on. On the other hand, even in an expanded system it is very unlikely that the A-2000's internal power supply will ever need to deliver its rated 200 watts of power output.

The actual UPS power requirements of an expanded Amiga System can be estimated (expresssed in DC watts loading the SPS). Such a system includes an A-2000 system unit with 1 MB main memory and 1 internal floppy drive (35 watts), a 40 MB half height hard drive (20 to 25 watts; the Miniscribe 3650 uses a nominal 18.6 watts), a hard disk controller card (5 watts), a 68020 co-processor board (10 to 15 watts), 4 MB of additional RAM on a memory card (20 to 25 watts), and a Microway flickerFixer advanced graphics board (5 watts). This configuration would require about 95 to 110 watts of DC power from the Amiga A-2000's power supply, and a VGA or Multiscan RGB/Analog monitor (these typically consume 85 to 100 watts). See my Comparison of MultiScan Monitors Part I in *Amazing Computing*, Vol. 3 #10).

By applying the above equations to the power requirements of the expanded A-2000/monitor system described above, it requires an amount of power ranging from 343 VA [(180/75)/7] to 400 VA [(210/.75)/7]. Note that I presented these equations using typical conservative values for the constants, with "0.75" and "0.7" defining the efficiency and load power factor, respectively. These values are typical (they could be in the range of about 0.6 to 0.95). It is likely that a 350 or 400 VA UPS would work with the system as described.

A 500 VA UPS unit might be the best overall choice for such a system. Usually, a UPS unit having higher wattage or VA ratings tends to have longer battery backup times (but there are exceptions). Another consideration is that a 500 VA unit would allow for some further A-2000 expansion such as a Genlock, another 4 MB of system RAM, an 80286 bridgeboard and a hard drive on a card, or a read/write magneto-optical drive. However, adding any power-hungry peripherals like a laser printer or a few 150 MB hard drives changes the above equation radically. If you plan to backup a laser printer, get a separate UPS expressly for that purpose. Do not add a laser printer onto any other UPS. Most likely a laser printer needs a UPS with an 750 or 800 watt rating due to the power surge of the fuser heating that operates while the printer is printing.

Again, generally the higher the VA rating, the more usable the UPS unit. In making a decision, always allow for system expansion. Second, remember that as the batteries in the UPS age, they become less efficient, and less able to provide maximum backup power and the expected backup time.

So, if the proper UPS is there, and the power becomes unstable or absent, the user will have a happy face. (Contrast this with the user's expression as the hard disk screeches to a halt, and its data ends up in Disk Heaven). All the UPS units rated here will give at least 5 minutes, and often more than 30 minutes, of battery backup time depending on the actual computer load presented.

(Look for UPS reviews by Steve Bender, in future issues of AC—Ed.)

•AC•

PD Serendipity

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Fred Fish189

Mackie V1.20
(Update to FF187)

This versatile cli/macro-key initiator is based on POPCLI with a "unique" method of screen-blanking. Try it! Version 1.20, includes source. By Tomas Rokicki.

NetHack V2.3 Part I

Part I of a two-part distribution of NetHack, which was too large to fit on a single disk, even when zoo'd. Part 2 is on disk 190. Both parts, along with *zoo* to unpack them, are required to use or rebuild NetHack. This release includes the source. Amiga work done by by Olaf Seibert.

Uedit V2.4g
(Update to FF173)

Version 2.4g of this nice shareware editor by Rick Stiles. Uedit features a learn mode, a command language, menu customization, and other user configurability and customizability features. Uedit includes only the executable file, and is distributed as shareware. This version replaces beta 2.4g.

Fred Fish190

GaryIcons

A collection of more interesting and useful icons from Gary Roseman.

ILBM2Image

This utility, by Denis Green, takes an IFF picture and generates a C source module which can be compiled and linked with your program to display the picture with the Intuition *DrawImage* function. ILBM2Image includes only the executable.

NetHack V2.3 Part II

Part II of a two-part distribution of NetHack, which was too large to fit on a single disk, even when zoo'd. Part I is on disk 189. Both parts, along with zoo to unpack them, are required to use or rebuild NetHack. This is version 2.3, and includes source. Amiga work by Olaf Seibert.

Fred Fish191

BlitLab

Program which lets you experiment with the blitter to your heart's content, in relative safety. It opens a Workbench window with gadgets for all the registers of the blitter, and allows you to manipulate individual registers and perform blits on a magnified bitmap. This is version 1.4, an update to the version released on disk number 84. Includes source. Author: Tomas Rokicki.

Blk

A requester-making tool employing various recursive algorithms including a recursive parser. It takes input text files and converts them to C-source for inclusion as requester declarations. This is an update to the version released on disk 152, with many enhancements. Includes source. Author: Stuart Ferguson.

FileBootBlock

This simple little program, by John Veldthuis, reads blocks 0 and 1 of a bootable disk and saves them as a program file that can be run or disassembled by programs like DIS or DSM. FileBootBlock includes the source in 68000 assembler.

ISpell V2.0.02
(Update to FF54)

A port of a Unix version of a freely distributable, screen-oriented, interactive spelling checker by Pace Willisson (with enhancements by Tomas Rokicki). ISpell includes the source.

Pz15

You know those cheap plastic puzzles made up of 15 numbered white tiles in a 4 by 4 arrangement with one empty square. They're back, this time with a twist. (This one is more challenging since you can't solve it by just prying out the pieces.) Pz15, by Mike Hall, includes the source.

(continued)

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ReSourceDemo

Demo version of ReSource, an interactive disassembler for the Amiga. This is a complete version except that the "save" features have been disabled. Version 0.36, binary only. Author: Glen McDiarmid.

Fred Fish 192

Eval

This package allows you to manipulate expressions. Currently, its two main functions are evaluation and differentiation. It also does some basic simplifications (based on pattern matching) to make the result of a differentiation more presentable. Includes source. Author: David Gay.

PacMan87

This is a nice little "pacman-like" game with some new obstacles to avoid like fire pits, stabbing knives, electrical arcs, and flame throwers. Features three levels of difficulty—easy, medium, and hard. Sounds can be toggled on or off. Keeps a record of the top ten scores. Shareware, binary only. Author: Steve Jacobs and Jim Boyd.

Fred Fish 193

KeyMapEd

Allows you to change the KeyMaps used with SetMap. This is a fully featured editor providing support for normal, string, and dead keys. The keyboard represented is from an A2000/A500, but it is fully compatible with A1000 keyboards. Version 1.02, includes source. Author: Tim Friest.

Zc

Modified version of the Sozobon C compiler from disk 171. It has been modified to generate code compatible with the A68k assembler from disk 186 and a new front-end control program makes it easy to use like the UNIX "cc" front-end. Version 1.01, includes source. Author: Johann Ruegg; Amiga work by Joe Montgomery.

Fred Fish 194

Moria

A single-player dungeon simulation. The object of the game is to defeat the Balrog, which lurks in the deepest levels of the dungeon. You begin at the town level above the dungeon, where you may acquire supplies, weapons, armor, and magical devices by bartering with shop owners, before descending into the dungeon to do battle. Amiga enhancements include pull down menus, graphics mode, pickup mode, a continuous move mode, a real-time mode, a message wait time mode, as well as other modifications that improve overall playability and take advantage of the unique features of the Amiga. Version 3.0, binary only, requires at least 1Mb of memory. Author: Robert Alan Koeneke and others. Amiga version by Richard Henderson and others.

Fred Fish 195

MicroEMACS V3.10

Version 3.10 of Daniel Lawrence's variant of Dave Conroy's microemacs. This is an update to the version released on disk 119. New features include multiple marks, more function key support, a better crypt algorithm, end-of-word command, a command line switch for setting environment variables, new hooks for macros, a command to strip trailing whitespace, internationalization features like foreign language message support, horizontal window scrolling, much faster search algorithm, Amiga intuition support, and more. Includes source and extensive online documentation. Author: Dave Conroy; MANY enhancements by Daniel Lawrence.

Fred Fish 196

HamPics

These are some of the most stunning digitized pictures yet for the Amiga. They were scanned at a resolution of 4096 by 2800 pixels, 36-bits per pixel, on an Eikonix 1435 slide scanner, cropped, gamma corrected, scaled, and converted to Amiga IFF HAM files. They are displayed with a special ILBM loader that handles overscan HAM images. Includes source for the display program. Author: Jonathan Hue.

Fred Fish 197

CTags

Create a tags file from the specified C, Pascal, Fortran, YACC, lex, or lisp sources. A tags file can be used by a cooperating editor to quickly locate specified objects in a program's source code. Berkeley version 4.7, includes source. Author: Ken Arnold, Jim Kleckner, and Bill Joy. Ported to Amiga by G. R. (Fred) Walter.

(continued)

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Find V1.2 (Update to FF134)

Utility which searches for files that satisfy a given boolean expression of attributes, starting from a root pathname and searching recursively down through the hierarchy of the file system. Very much like the Unix find program. Version 1.2, includes source. Author: Rodney Lewis.

FixHunk

Program that modifies executable files to allow them to run in external memory. It forces all DATA and BSS hunks in the file to be loaded into CHIP memory. CODE hunks will still load into FAST RAM if available. New features include an interactive mode to select where each DATA or BSS hunk will load into memory, support for overlays, support for AC BASIC compiled programs, and support for new hunk types as used by "blink". Version 2.1, binary only. This is an update to version 1.2a on disk 36. Author: D.J. James.

Nro

Another roff style text formatter. This is version 1.5, an update to the version released on disk 79. New features include generation of ANSI/ISO codes for bold, italics, and underline, more than one formatting command on a line, longer macro names, and many more formatting commands. Includes source. Author: Unknown; posted to Usenet by Alan Vymetalik. Many enhancements by Olaf Seibert.

Stevie V3.35a (Update to FF166)

Public domain clone of the UNIX 'vi' editor. Supports window-sizing, arrow keys, and the help key. Version 3.35a, includes source. Author: Various; Amiga work by G. R. (Fred) Walter.

Fred Fish 198

Charon

Charon is Bradley's entry for the First Annual Badge Killer Demo Contest. The text of the demo was written by Lord Dunsany (long before the Amiga). Bradley created the illustrations and animation. The soundtrack is a traditional Scottish tune, "The Arran Boat". Author: Lord Dunsany (1915), Bradley Schenck (1988).

Fred Fish 199

ASimplex

An implementation of the Simplex algorithm for solving linear programs. It uses the standardized MPSX-format for input data files. Version 1.2, includes source. Author: Stefan Forster.

Csh V3.02a

Version 3.02a of a csh like shell derived from Matt Dillon's shell, version 2.07. Includes many new or improved commands, some bug fixes, etc. Includes source. By Matt Dillon, Steve Drew, Carlo Borreo, Cesare Dieni.

MIDIsoft V1.0

A program to transfer sound samples between the Amiga and a Roland S-220. Binary only. Author: Dieter Bruns.

Pyro V1.1

Screen-blanking program that goes beyond the normal blanking process. When there are no input events, pyro takes over and starts a little fireworks display in color. Version 1.1, binary only. Author: Steve Jacobs and Jim Boyd.

SnipDemo

Demo version 1.23 of signal-processing program sold by Digital Dynamics. Binary only. Author: John Hodgson.

Viewer

A very small program for displaying IFF pictures of any resolution. This one is written in assembly code and is only 988 bytes long. Binary only. Author: Mike McKittrick.

Fred Fish 200

NotBoingAgain

This is Dr. Gandalf's entry for the First Annual Badge Killer Demo Contest. It is an interlaced HAM animation with nicely integrated sound effects. It is a great visual pun on the original Boing demo, but to say any more would ruin the effect. Binary only, requires 1 Mb of memory. Author: Dr. Gandalf (Eric J. Fleischer, MD).

Tank

This is Vincent's entry for the First Annual Badge Killer Demo Contest. It is an animation of a "fishtank simulator", with sound effects and a cute twist. Binary only. Author: Vincent H. Lee.

•AC•

C Notes
from the C Group

Formatted Output

by Stephen Kemp

In the past, I have tried to explain the basics required of programming in the C language, including variable types and program statements. In this and future articles, I will build upon your knowledge of the basics to discuss "broader" C language concepts. While this does not mean I will never again mention the basics, discussion will be limited to brief reminders.

If you have been following this column, you may remember a promise I made many moons ago to further discuss the ins and outs of the printf function and its derivatives. Well, now seems to be as fitting a time as any to make good on that promise. So, here it goes.

Introductions

The printf function and similar functions like fprintf and sprintf are generally referred to as formatted output functions. These formatting functions are perhaps the most versatile functions in the standard C library, but they are often the most underutilized because many programmers fail to learn what these functions are capable of. Now I have to admit that I cannot spout off every variation of the instructions a formatting function will accept without pulling out my trusty reference material. Knowing their general capabilities, however, may save you from writing a lot of unnecessary code.

Definitions

The logical place to begin this discussion is with function definitions. We will focus primarily on the functions printf, fprintf and sprintf. There may be several other functions in your library that have a number of similarities, including some formatting input functions, but these three represent the primary output formatting functions.

```
printf(char *format [,arg]...)

fprintf(FILE *stream, char *format [,arg]...)

sprintf(char *output, char *format [,arg]...)
```

These function definitions raise a couple of new topics that need to be addressed before continuing.

First, notice that the last argument in each definition has brackets [] surrounding it. This means these functions support a variable number of arguments. The brackets should not actually be included in the statement when you use it in your program. The actual number of parameters expected is determined by the formatting options identified in the format string. These formatting options will be discussed later in greater detail. For now, just remember that it will be important to have a parameter for each corresponding option in the format string.

Also note that these functions use "streams". A "stream" is a file or device that can be accessed via information contained in a FILE structure. Only the function "fprintf" requires a stream as a parameter, but printf assumes a specific stream already exists. Using streams is the most portable means of addressing I/O-type objects because the FILE structure is independent enough to address a variety of objects. Most C programs assume that at least two global streams—stdin and stdout (standard-in and standard-out)—are already open and ready for use. In some environments, several other global streams are open as well, including stderr (error), stdaux (auxiliary), and stdprn (standard print).

Referring back to the definitions, printf sends its output to the standard output stream, which is usually the console. The output from fprintf is sent to the stream specified in the first parameter. This stream can be an open disk file or some other device, including stdout. Sprintf does not make use of a stream. Rather, it formats its output and places it into the variable identified in the first parameter.

Format strings

As you may have already gathered, the format string is the most important parameter these functions require. This character string can contain both ordinary characters and format specifications. All characters which are not part of a format specification are simply output one for one. So if you want to output a simple message—say, to the console—you could send the string with no formatting specifications and no additional parameters.

(continued)

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```
printf("Hello and Welcome to My Program");
```

As well as being able to handle simple tasks, these functions also have very powerful formatting capabilities. By imbedding control specifications in the format string, an almost unlimited variety of outputs can be generated. Format specifications always involve at least two components, but allow for a number of other format sequences to control minimum and maximum length, justification, and several other special features. Format specifications (sometimes referred to as conversion controls) can be diagrammed like this:

Format Specification Definition

```
% [-] [+ or #] [width or *] [.precision] [l] code
```

The percent must always be the first character. Items enclosed in brackets are optional and their actions depend upon the type conversion taking place. (Again, do not include brackets when using control strings. They are used in the definition solely to indicate that the parameter is optional.) The second component that must occur along with the % is the conversion code which consists of a single alphabetic character. The options identified between these two items ultimately determines how the output will look. To begin the discussion of formatting options (or flags), let's examine the list of available conversion characters.

Format Specification Control Characters

c - a single ASCII character
d - a decimal integer
u - an unsigned decimal integer
o - an unsigned octal
x - an unsigned hexadecimal
f - a decimal floating-point number
e - a decimal floating-point in scientific notation
g - the shorter of f or e
s - a null (\0) terminated string of characters

This is a list of the primary conversion types supported by the output formatting functions in a standard C library. Remember to use lowercase letters. Also, always check the reference manual that comes with your C compiler, because not everyone agrees upon what is "standard".

Some versions of the C language may also support variations on these control types. For instance, some allow %X, which means output a hexadecimal number with uppercase letters. Upon encountering the % character, each formatting output function will begin watching for the closing control character to identify the type(s) of parameter(s) that will follow the format string. If a control character cannot be identified, the trailing character will simply be printed. This is an important point to remember because, if you want to print a percent character, you have to include two percent characters in your format string ("%%").

Most C programmers begin to use simple format specifications right away. By "simple" I mean those that use only the required % and a conversion character. Most C tutorials (including this column) introduce format specification like %s, %d and %f in the first few lessons. But controls like these are just the tip of the iceberg. The specifications that can be placed between the "required" characters of a format specification can make the difference between "ho-hum" and exceptional output. Before discussing the options available for each conversion, let's review some "setup" information about the format specification diagram presented earlier.

Ground rules

The order of the options presented in the diagram is important. It is okay to exclude options, but if an option is out of place, it could make the output look odd, or cause the entire program to fail. Remember, the number of parameters that these functions expect is determined by the evaluation of the format string. In addition to the specific order, remember that no spaces should occur between the % and the final control character regardless of which options you do or do not use. (As always, there is one exception to this rule which we'll discuss later.)

The first optional parameter [-] can be used to force the left- justification of the resulting output variable. It DOES NOT cause a negative sign to appear on negative numbers. If you intend to use this option, the justification character must occur as the second character in the control string. This option is normally used in conjunction with the width option discussed later. The + flag indicates that a plus sign be prefixed to non-negative numbers.

Negative numbers will automatically include a minus sign. A # flag means a leading 0 for octal numbers, a leading 0x for hexadecimal numbers, or trailing 0's for floating-point numbers should be included on the resulting output. (Floating-point numbers can actually have both the + and # flags included in the format.) The exception to the "space" rule mentioned earlier occurs in this option. If a space character is used instead of the plus sign, the resulting number will include a leading space character.

The width option, [width or *], specifies the minimum number of characters the output must contain. A digit string can be used to indicate the width (i.e., %2c, %10d, or %100s). As an alternative, an asterisk (*) can be used to indicate that the width is a variable which must be retrieved before the conversion variable (i.e., printf("%*s",width,string);) If the resulting conversion is larger than the specified width, it is usually not truncated (some compilers differ on this, so check your manuals). Shorter results will be padded on the left (or the right if the justification flag is included) until the width is reached. Also, if the width is indicated with a leading 0, like %010d, the output will be padded with zeros instead of spaces.

Finally, we come to the last few optional parameters of format control strings which might be more appropriately identified as "type specific" flags. I refer to these options like this because the operation that will be performed is determined by the conversion character that terminates the control code. Additionally, these flags may mean nothing to the resulting conversion character—if included, might cause the control to misfire. Precision is indicated by a digit string that begins with a period. This option normally applies only to floating-point numbers (types e, f and g) or strings (type s). For floating-point numbers, this value represents the number of digits to be printed to the right of the decimal point. In strings, precision is used to specify the maximum number of characters that should be included from the string parameter that follows. The l flag tells the function that the corresponding variable is a long integer rather than a short integer (the default for many compilers).

Examples

With these rules in mind, take a look at the listed examples. In each category, I have included a diagram of the control parameters allowed by the specified character code. The first example for each conversion code includes a simple control string and demonstrates the resulting output. Trying to list an example of each possible variety of output would produce a very long report, so the examples that follow will include only a few variations of the options (flags) discussed earlier. Please note that I have included a leading and trailing colon ":" inside the format string to demonstrate the variations of the resulting output. While reviewing this list of examples, assume that each format string which does not include the variable width [*] has been lifted from a statement similar to that specified in Form 1 of the statements below. Those that do contain the * (indicating a variable width) are drawn from the statement identified as Form 2, which has specified a parameter width of 5 characters.

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```
printf(format,variable);          /* Form 1 */
printf(format,5,variable);         /* Form 2 */
```

Formatting Examples

```
Character Control
%[-][width]c

":%c:"   :A:
":%5c:"  :    A:
":%*c:"  :    A:
":%-*c:" :A    :
```

(continued on page 91)

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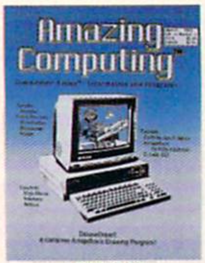

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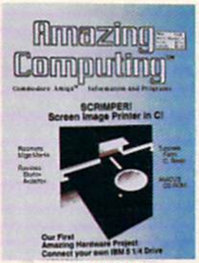

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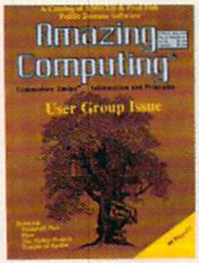

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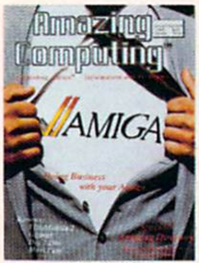

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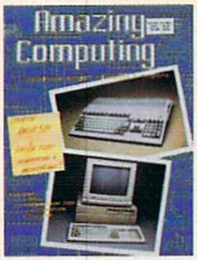

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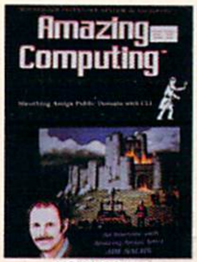

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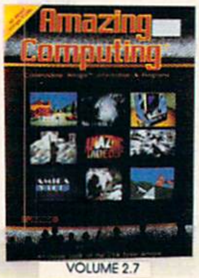

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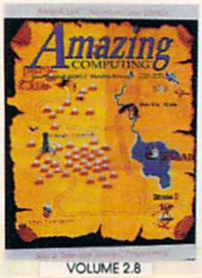

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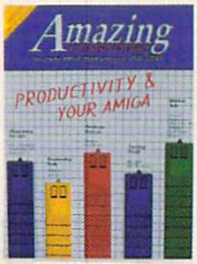

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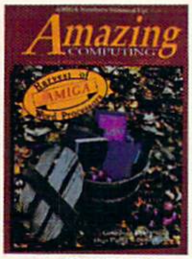

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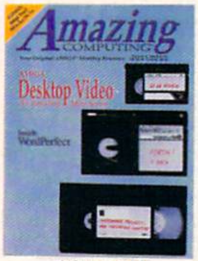

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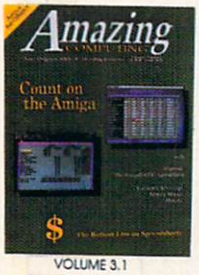

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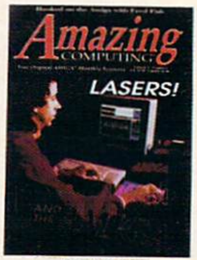

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Plus Amazing monthly columns... Amiga Notes, Roomers, Modula-2, 68000 Assembly Language and The Amicus Network.
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tutorial in document creation, plus some jazzy enhancements.
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The Developing Amiga by Steven Pietrowicz
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(*C Notes* *continued from page 87*)

```
Integer Control
%[-][+][width][l]d

“:%d:”   :125:
“:%+d:”  :+125:
“:% d:”  : 125:
“:%04d:” :0125:


Unsigned Integer Control
%[-][width][l]u

“:%u:”   :36000:
“:%*u:”  :36000:
“:%-10u:”    :36000     :


Octal and Hexadecimal Number Control
%[-][#][width][l]o
%[-][#][width][l]x

“:%o:”   :377:
“:%x:”   :ff:
“:%#o:”  :0377:
“:%#*x”: :0xff :


Floating-point Number Controls
%[-][+][#][width][.precision]f
%[-][+][#][width][.precision]e
%[-][+][#][width][.precision]g

“:%f:”   :1234.567890:
“:%e:”   :1.234568e+03:
“:%g:”   :1234.57:
“:%.2f:” :1234.57:
“:%10.3e:”     : 1.235e+03:


String Control
%[-][width][.precision]s

“:%s:”   :ABCDEFGH:
“:%10s:” :  ABCDEFGH:
“:%10.5s:”    :     ABCDE:
“:%-10.5s:”  :ABCDE     :
“:%*s:”  :ABCDEFGH:
```

Final words

Now I hate to keep repeating this, but it really must be emphasized. Check the C manual provided with your compiler before assuming anything you read here is true. For the most part, you will find that these descriptions apply to your compiler. However, some variations may exist.

We always seem to get back to the old "is C standard" topic. Although the C language was envisioned as being the one "portable" language, this isn't strictly true of standard C function libraries. Compiler developers provide libraries, and it is ultimately up to them to ensure that the libraries are compatible with other compilers. Sometimes the only way to know for sure whether your compiler and library supports a particular option is to write some code and try it.

Write a test program that uses formatted output. Try as many variations of the format specifications as you can. I hope you can tell from the examples provided and the general discussion just how important (and easy-to-use) these functions can be. The more you understand how and what the functions printf, fprintf, and sprintf are capable of doing, the better your programs will be. Remember, you can learn a lot from experimenting with your own programs.

•AC•

INSTA SOUND

AmigaBASIC Sound Generator

by Greg Stringfellow

Ever try creating sounds in AmigaBASIC? Did you get the sound you wanted? I tried but could never get the sound I wanted for my program. That's when I discovered the AmigaBASIC WAVE command and created Insta Sound.

Insta Sound is a program for those who enjoy writing programs with sound in them. It lets you create the sounds you like, then save them as an AmigaBASIC program. It even includes the current sound frequency and duration, as well as the choice of having the Amiga's sound filter on or off.

Although Insta Sound does a lot of the work for you, creating a sound is not as easy as it may seem. Creating a sound is like creating a program—you rely heavily on the trial and error approach. Because of this, I have included as many features as possible to help you produce the sound you need. Most of these features will require keyboard input, so mouse input is at a minimum.

The tools of Insta Sound

Insta Sound tools are available by menu selections. They will open a window at the top left-hand corner of the screen and include Edit, All Change, Check Value, Change Note and Change Duration. I will discuss these tools later on in detail. The descriptions below are just to give you an idea of the tools.

The Sound menu

The Sound menu includes Save, Hear, Edit and Quit. Save appends your sound as data statements onto an already created program, or it creates a new program. Hear lets you hear your sound. Edit allows you to edit one element of your sound. Quit lets you end the program quietly without having to press Ctrl-C.

The Special menu

The Special menu includes a list of commands to help you create the sound you are looking for. This list includes Lower Pitch, Raise Pitch, White Noise, Erase All, All Change, Check Value, Undo Last and Turn Filter On/Off.

Lower and Raise Pitch does exactly what the name says. White Noise turns all the elements of your sound into random elements. Erase All erases all the sound. All Change changes a specified number of elements into the range of your choice. Check Value checks the value of an element. Undo Last will undo the last command that changed the sound being worked on. Finally, Filter On/Off turns the Amiga's sound filter on or off. If the power light goes off while you are using the filter command, don't be alarmed. It is totally harmless.

The Other menu

The Other menu has two tools, Change Note and Change Duration. They affect the way you hear the sound and how long the sound lasts. Note that both of these are not affected by the Undo Last tool of the Special Menu.

Insta Sound graph

Insta Sound's graph provides a rough estimate of your sound's value. Each point represents an element. There are 510 elements in all but only 255 can be displayed at once. To see the other 255, you must use the Change Graph Halves gadget, which will be discussed later.

The WAVE command in AmigaBASIC

The WAVE command affects the output of the SOUND command in AmigaBASIC. WAVE will accept an array of at least 256 elements, all of which must be greater than -127, and less than 127. It must also know which speaker this waveform will use. This means you can use four different waves in a program. You can erase the array with the ERASE Command to save memory after the WAVE command is executed. As nice as the WAVE command is, it does not compare to a digitized sound because you can only use a small number of elements in an array.

The SOUND command in AmigaBASIC

The SOUND command is a little easier to use than the WAVE command. All you need to know is the frequency of the sound you want, the duration of the sound, the volume of the sound, and the speaker you wish to send it to. While this may seem like a lot, it really isn't. Check your AmigaBASIC manual to find out just how simple this command is.

The tools described

All the tools Insta Sound incorporates are fairly easy to learn and use. They ask only for the information they need—the rest is automatic. The following is an explanation of each tool to help the amateur sound engineer become a pro.

Save saves sounds as a program file, or appends the data to an already existing program. The data includes the memory location to turn the filter off, the current frequency value, and the current duration.

Hear lets you hear the sound.

Edit allows you to change one element of the sound. If you want to change more than one, use the All Change command in the Special menu.

Quit lets you quit the program cleanly, closing all windows and screens.

Lower Pitch and **Raise Pitch** lower and raise the sound's pitch. Although the result of these two is not always evident in the graph, they do work.

White Noise makes every element in your sound random. If you do not achieve the effect you want, try again.

Erase All does just what it says, erasing all the current sound. If you should erase a sound accidentally, use the Undo Last command in the Special menu.

All Change modifies the value of all the selected elements from one specified point to another.

Check Value checks the value of a specified point.

Undo Last will undo the last command that edited the current sound. It will also undo Erase All.

Turn Filter ON/OFF turns the Amiga's filter on or off. If the filter is off, your sound will become more brassy.

Print Values sends all the values of your sound to the printer as data statements.

Change Note changes the frequency value when you use the Hear command. The lower the number, the lower the pitch. The higher the number, the higher the pitch.

Change Duration changes the duration value of the sound when you use the Hear command. A higher number will lengthen the sound duration. A lower number will shorten the sound duration.

See Programmer. Try this one for yourself.

The box on the lower left-hand corner of the screen will change the graph view from one half to the other. This will not affect the sound in any way.

A final note

As I have said before, the trial and error method is the best way to achieve the sound you want. Some sounds will be a cinch, others will be very hard. Hopefully, my program will help. Good Luck.

Listing One
Insta Sound

```
' “InstaSound” - An Amiga Sound Generator
' By Greg Stringfellow


Sg=0:Eg=255:DEFINT Noise
DIM Noise(527),noise2(527),Noise3(512)
MENU ON:dur=10.42:note=783.99
ON MENU GOSUB CheckMenu:SCREEN 1,640,200,3,2
WINDOW 2,“Insta Sound”,(0,0)-(631,185),20,1
WINDOW OUTPUT 2
PALETTE 4,.93,.2,0:PALETTE 0,0,0,0
PALETTE 5,0,.93,.87:PALETTE 6,.73,.73,.83
PALETTE 7,1,1,1:MENU 4,0,0,“”
MENU 1,0,1, “Sound”:MENU 2,0,1, “Special”
MENU 3,0,1, “Others”
MENU 1,1,1, “Save”:MENU 1,2,1, “Hear”
MENU 1,3,1, “Edit”:MENU 1,4,1, “Quit”
MENU 2,1,1,“Lower Pitch”:MENU 2,2,1,“Raise Pitch”
MENU 2,3,1,“White Noise”:MENU 2,6,1,“Erase All”
MENU 2,4,1,“All Change”:MENU 2,5,1,“Check Value”
MENU 2,7,1,“Undo Last”:MENU 2,8,1,“Turn Filter Off”
MENU 3,1,1,“Print Values”:MENU 3,2,1,“Change Note”
MENU 3,3,1,“Change Duration”:MENU 3,4,1,“See Programmer”
FOR i=0 TO 255:Noise(i)=0:NEXT i
' Create Screen
x1=0:y1=0:x2=631:y2=185
FOR i=1 TO 7
LINE  (x1,y1)-(x2,y2),4,b:x1=x1+5:y1=y1+5:x2=x2-5:y2=y2-5
LINE  (x1,y1)-(x2,y2),5,b:x1=x1+5:y1=y1+5:x2=x2-5:y2=y2-5
NEXT i:COLOR 4,5:LOCATE 11,33:PRINT “Insta Sound”
COLOR 1,0:LOCATE 12,28:PRINT “By  Greg Stringfellow”
LOCATE 13,17
PRINT “Please click left mouse button to continue!”
GOSUB GetMouse

Startup:
CLS
LINE (60,7)-(572,137),6,b
LINE (60,72)-(572,72),6
COLOR 7,0:LOCATE 10,5:PRINT “0”
LOCATE 2,3:PRINT “127”:LOCATE 17,2:PRINT “-127”
LINE (50,165)-(70,176),3,b:LOCATE 22,11
PRINT “Change Graph Halves.”
GOSUB CreateGraph

Main:
GOSUB CheckMouse
GOSUB CheckMenu
GOTO Main

CheckMenu:
a=MENU(0)
IF a=1 THEN m=MENU(1):GOSUB Sound1
IF a=2 THEN m=MENU(1):GOSUB Special
IF a=3 THEN m=MENU(1):GOSUB Others
a=0:RETURN

CreateGraph:
GOSUB PleaseWait
LOCATE 19,35:PRINT Sg”-”Eg”   “
LINE (61,8)-(571,71),0,bf:LINE (61,73)-(571,135),0,bf
LINE (60,72)-(572,72),6:x=61:FOR i=Sg TO Eg STEP 2
noise2(i)=Noise(i)/2:noise2(i)=ABS(noise2(i)+-71.5)
i=i+1:IF Noise(i+1)>255 THEN Noise(i+1)=255
noise2(i)=ABS((INT(Noise(i)/2))+-71.5):i=i-1
IF i=255 THEN PSET (x,noise2(i)):RETURN
LINE(x,noise2(i))-(x,72),3
LINE(x,noise2(i+1))-(x,72),3
x=x+4
NEXT i:GOSUB PleaseWaitErase:RETURN

PleaseWait:
LOCATE 22,50:PRINT “Please Wait...”
RETURN

PleaseWaitErase:
LOCATE 22,50:PRINT “                  “
RETURN

Sound1:
IF m=1 THEN
 GOSUB PleaseWait
 WINDOW 3,“Save”,(5,5)-(300,50),18,1:WINDOW OUTPUT 3
 PRINT “Enter the name of an existing”
 PRINT “program to append sound data to.”
 INPUT na$
 IF na$ = “” THEN
   WINDOW CLOSE 3
   GOSUB PleaseWaitErase:RETURN
 END IF
 OPEN “A”,#1,na$:s=0:e=16
 a$=“' Note Value=”:a$=a$+STR$(note):PRINT #1,a$
 a$=“' Duration=”:a$=a$+STR$(dur):PRINT #1,a$
 a$=“POKE 12574721&,254":IF f=1 THEN PRINT #1,a$
 FOR z=0 TO 31:a$=“DATA “
 FOR i=s TO e:a$=a$+STR$(Noise(i)):a$=a$+“,”:NEXT i
 s=e+1:e=e+16:IF e=256 THEN e=e-1
 PRINT #1,a$:NEXT z
 CLOSE #1:m=0:WINDOW CLOSE 3:GOSUB PleaseWaitErase
 RETURN
END IF
IF m=2 THEN
 GOSUB PleaseWait
 WAVE 0,Noise:SOUND note,dur,,0
 m=0:GOSUB PleaseWaitErase:RETURN
END IF
IF m=3 THEN
 GOSUB PleaseWait
 WINDOW 3,“Edit”,(5,5)-(310,50),18,1:WINDOW OUTPUT 3
 FOR i=0 TO 510:Noise3(i)=Noise(i):NEXT i
 INPUT“Enter number to edit (0-510) “,e
 IF e<0 OR e>510 THEN
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
 END IF
 PRINT “CURRENT VALUE: “Noise(e)
 INPUT “Value to change to (-127 to 127) “,nv
 IF nv<-127 OR nv>127 THEN
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
 END IF
 Noise(e)=nv:m=0:WINDOW CLOSE 3
 GOSUB CreateGraph:RETURN
END IF
IF m=4 THEN
 WINDOW 3,“Quit”,(5,5)-(310,50),18,1:WINDOW OUTPUT 3
 PRINT “Are you sure you want to “
 INPUT “quit (Y/N)? “,a$
 a$=UCASE$(a$):IF a$=“Y” THEN GOSUB Quit
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
END IF
```

(continued)

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```
Special:
IF m=1 THEN
 GOSUB PleaseWait
 FOR i=0 TO 510:Noise3(i)=Noise(i)
 IF Noise(i)=-127 THEN Noise(i)=Noise(i)+1
 Noise(i)=Noise(i)-1:NEXT i
 m=0:GOSUB CreateGraph:RETURN
END IF
IF m=2 THEN
 GOSUB PleaseWait
 FOR i=0 TO 510:Noise3(i)=Noise(i)
 IF Noise(i)=127 THEN Noise(i)=Noise(i)-1
 Noise(i)=Noise(i)+1:NEXT i
 m=0:GOSUB CreateGraph:RETURN
END IF
IF m=3 THEN
 GOSUB PleaseWait:RANDOMIZE TIMER
 FOR i=0 TO 510:Noise3(i)=Noise(i)
 Noise(i)=INT(RND*-254)+126:NEXT i
 m=0:GOSUB CreateGraph:RETURN
END IF
IF m=6 THEN
 GOSUB PleaseWait
 FOR i=0 TO 510:Noise3(i)=Noise(i):Noise(i)=0:NEXT i
 m=0:GOSUB CreateGraph:RETURN
END IF
IF m=4 THEN
 GOSUB PleaseWait
 WINDOW 3,"All Change",(5,5)-(350,50),18,1:WINDOW OUTPUT 3
 INPUT "From (0-509)?";fr
 IF fr<0 OR fr>509 THEN
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
 END IF
 PRINT "To ("fr+1"-510)";:INPUT t
 IF t<fr OR t>510 THEN
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
 END IF
 INPUT "Value to change all to (-127 to 127)? ",v
 IF v<-127 OR v>127 THEN
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
 END IF
 FOR i=0 TO 510:Noise3(i)=Noise(i):NEXT i
 FOR i=fr TO t:Noise(i)=v:NEXT i
 m=0:WINDOW CLOSE 3:GOSUB CreateGraph:RETURN
END IF
```

```
IF m=5 THEN
 GOSUB PleaseWait
 WINDOW 3,"Check Value",(5,5)-(340,50),18,1:
 WINDOW OUTPUT 3
 INPUT "Number to check (0-510)? ",n
 IF n<0 OR n>510 THEN
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
 END IF
 PRINT "CURRENT VALUE:"Noise(n)
 PRINT :PRINT "CLICK LEFT BUTTON TO CONTINUE"
 GOSUB GetMouse
 m=0:WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
END IF
IF m=7 THEN
 GOSUB PleaseWait
 FOR i=0 TO 510:Noise(i)=Noise3(i):NEXT i
 m=0:GOTO CreateGraph:RETURN
END IF
IF m=8 THEN
 IF f=0 THEN GOSUB FilterOff:m=0:RETURN
 IF f=1 THEN GOSUB FilterOn:m=0:RETURN
END IF

Others:
IF m=1 THEN
 COLOR 7,0:LOCATE 20,10:GOSUB PleaseWait
 OPEN "PRT:" FOR OUTPUT AS #1:a$="DATA "
  FOR z=1 TO 31:a$="DATA "
 FOR i=s TO e:a$=a$+STR$(Noise(i)):a$=a$+",":NEXT i
 s=e+1:e=e+16:IF e=256 THEN e=e-1
 PRINT #1,a$:NEXT z
PRINT #1,a$:CLOSE #1
GOSUB PleaseWaitErase:m=0:RETURN
END IF
IF m=2 THEN
 GOSUB PleaseWait
 WINDOW 3,"Change Note",(5,5)-(300,50),18,1
 WINDOW OUTPUT 3
 PRINT "CURRENT VALUE: "note
 INPUT"Enter a note value (20-15000) ",note1
 IF note1<20 OR note1>15000 THEN
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
 END IF
 note=note1:m=0:WINDOW CLOSE 3:GOSUB PleaseWaitErase
 RETURN
END IF
IF m=3 THEN
 GOSUB PleaseWait
 WINDOW 3,"Change Duration",(5,5)-(300,50),18,1
 WINDOW OUTPUT 3
 PRINT "CURRENT DURATION:"dur
 PRINT "0 Fast - 77 Slow"
 INPUT "New duration (0-77)? ",d
 IF d<0 OR d>77 THEN
 WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
 END IF
 dur=d:m=0:WINDOW CLOSE 3:GOSUB PleaseWaitErase:RETURN
END IF
IF m=4 THEN
 WINDOW 3,"Programmer",(5,5)-(360,40),18,1
 WINDOW OUTPUT 3
 PRINT "Insta Sound was created by Greg Stringfellow"
 PRINT "on June 20,1988."
 PRINT "PRESS THE LEFT MOUSE BUTTON TO CONTINUE"
 GOSUB GetMouse:m=0
 WINDOW CLOSE 3:RETURN
END IF

GetMouse:
5 IF MOUSE(0)<>1 THEN GOTO 5
RETURN

CheckMouse:
IF MOUSE(0)<>1 THEN RETURN
IF MOUSE(3)>70 OR MOUSE(3)<50 THEN RETURN
IF MOUSE(4)>176 OR MOUSE(4)<165 THEN RETURN
PAINT (52,166),3:IF Sg=0 THEN Sg=256:GOTO 10
IF Sg=256 THEN Sg=0
10 PAINT (51,166),0:LINE (50,165)-(70,176),3,b
IF Eg=255 THEN Eg=510:GOTO 15
IF Eg=510 THEN Eg =255
15 GOSUB CreateGraph
RETURN

Quit:
MENU RESET:SCREEN CLOSE 1:POKE 12574721&,252:WINDOW CLOSE 2
ERASE Noise,noise2,Noise3:END

FilterOff:
f=1:POKE 12574721&,254:MENU 2,8,1,"Turn Filter On":RETURN

FilterOn:
f=0:POKE 12574721&,252:MENU 2,8,1,"Turn Filter Off":RETURN
```

•AC•

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Guru Wisdom

and the Amiga

by David W. Martin

Who are you Mr. Guru?

The Amiga Guru is one thing most Amiga users become familiar with early on. In fact, at one point or another, everyone has been presented with the following requester box:

"Software error - task held
Finish ALL disk activity
Select CANCEL to reset/debug"

When you press the CANCEL button, the black and red alert box appears with the Guru Meditation message:

"Software Failure. Press Left Mouse Button to Continue.
Guru Meditation #000001E8.00C11540"

The average user will interpret these Guru messages as meaningless junk and simply reset the computer by clicking the left mouse button. Some users even become angry, thinking their Amiga was bug-ridden and the operating system was buggy. Was the Guru created as some sort of cruel joke by the designers of the Amiga, or does it in fact provide some sort of information to the user?

Yes, information is given by that Guru Meditation (or Guru Alert) number. In fact, you will find that the Guru does seek to impart some inherent wisdom from those seemingly meaningless numbers. The number as a whole can be used as a debugging aid by Amiga programmers. When divided into separate parts, the Guru Meditation number can be used to determine why the problem occurred. The tables accompanying this article provide information necessary for decoding the number given by the Guru Meditation.

Guru Decoder Ring

As an exercise in decoding Guru message numbers, using the tables provided, let's decode the following:

```
#01000009.00C11F3B2
```

Now let's break the number into its four principle parts:

```
01  00  0009.  00C11F3B2

#01000009.00C11F3B2
```

The first part of the number (01) tells you what device or library the error came from. There are twenty of these libraries, devices, etc., and they are listed in the table that accompanies this article. Looking up the value '01' in the chart tells you the error occurred while using the EXEC library. The zero at the beginning of the number indicates it would be possible to recover from this error. However, recovery is only possible with

(continued)

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the right equipment and knowledge of how to do the debugging. If the beginning digit had been an eight or higher, then there is no hope of recovery from the error.

Basically, if the high bit of the device or library number is set, the error is irreversible. It's also true that fatal errors will turn the entire screen black, while recoverable errors only displace the normal screen down a little bit.

```
#01000009.00C11F3B2
```

The second part of the number (00) tells you the general error code that occurred. The seven possible codes are listed in the chart. In this case, the general error is not attributable to any of the seven codes. When this occurs, the general error code takes on a value of '00'.

```
#01000009.00C11F3B2
```

The third part of the number (0009) tells you the specific error that occurred or exactly what went wrong. In this case, the sample contains '0009', and the chart shows that, in the EXEC library, a code of nine indicates a Free Twice error.

```
#01000009.00C11F3B2
```

The last eight digits of the number tell you the hexadecimal address of the task (or program) that reported the error. Note that the address might be different each time you run the program and the error occurs. The address change is caused by the fact that, since the Amiga is a multitasking machine, all programs must be relocatable.

Guru examples

A few example errors follow:

```
#00000003.00C11BAC

00       - CPU TRAP ERROR
00       - Not one of the general errors
0003     - CPU Address Error
00C11BAC - of the task starting at $C11BAC
```

```
#81000009.00C11F3B

81       - Fatal error in the EXEC Library
00       - Not one of the general errors
0009     - Free Twice Error
00C11F3B - of the task starting at $C11F3B
```

```
#31038009.48454C50

31       - Recoverable error in the EXECLibrary
03       - caused by OpenLibrary Error
8009     - Appears to be a free twice error but
48454C50 - Spells "HELP" in hexadecimal
```

Guru notes

The examples provided above are only a sampling of the possible errors that can occur. Many different combinations are possible depending on the state of your computer at any given time.

The last error example above is a rather interesting one. It seems that the Amiga EXEC uses the word "HELP" in a special way. The word HELP is placed at location zero in the Amiga's memory before resetting the system. This occurs when Intuition finds the system in so bad a state that a normal Guru error message cannot be displayed. When the system is rebooted, location zero is checked for the text "HELP" and, if it's there, a message similar to Example 3 above is displayed.

Guru help

In the beginning, there were no real means of bypassing the Guru. You simply had to live with him, and he with you.

All that changed with the introduction of a software package called G.O.M.F. from Hypertek/Silicon Springs Development Corp., written by Christian Johnsen. If you're looking to interrupt the Guru's life and make yours easier, this program is for you. It provides a means of recovering from Guru errors, and it even tells you what kind of error occurred. G.O.M.F. decodes the lengthy meditation number for you and tells you what it means in plain English.

Myths, legends, and lore

There are many myths and legends surrounding the Amiga that have circulated among Amiga users for many years. Some of the myths and legends have proven true (i.e., the infamous Poodle paw print in the A1000). Some are harder to prove, but fun to believe. Of my favorites, the one regarding how the Guru Meditation error was named is the best and hardest to prove. The story goes something like this:

Once upon a time, there was a company called Amiga that was developing all kinds of computer products. The products they developed and sold helped to fund development of that computer we know and love today—the Commodore Amiga.

One of the products they developed, the JoyBoard, was a joystick-type device that a person stood upon—sort of an electronic surf board. This board was used to add realism and challenge to computer games at the time.

However, the staff at Amiga found other uses for the JoyBoard, one of which involved using the board as a platform upon which a person could sit and meditate. This meditation process involved balancing on the JoyBoard. The name of the

(continued)

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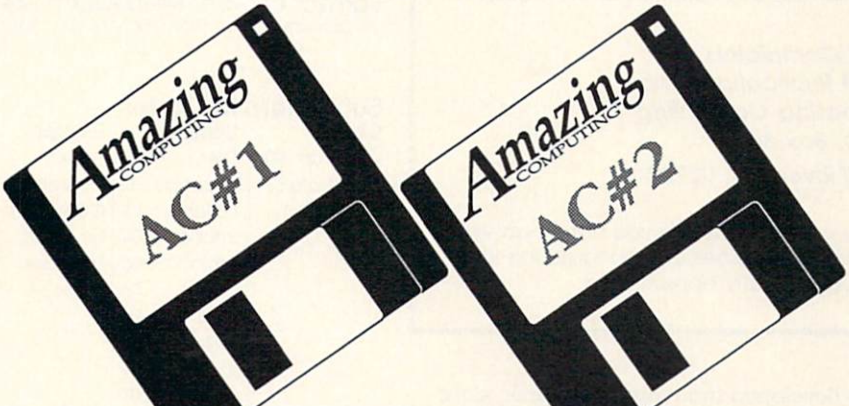

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Guru error of today was developed from this office game, since the act of falling over or losing your balance was called a Guru Meditation Error.

This phrase apparently caught on at Amiga and, by the time Commodore bought the Amiga computer from them, the Guru had become an inherent part of the Amiga operating system. In fact, rumor has it that Commodore insisted on changing the name of the Guru to something else, but the threat by Amiga developers to quit if such a change were enacted prevented any such alteration. In the end, the Guru prevailed, and he's now definitely here to stay.

Disclaimer: The statements presented in the above story are rumors in the purest sense. At press time, the story remains unconfirmed and is printed for entertainment value only. Accordingly, the author, staff, and associates of Amazing Computing cannot be held responsible for the statements made in the story.

Update

As I prepare to submit this article for publication, several events affecting the Guru are taking place.

The makers of G.O.M.F. have introduced a hardware device that is supposed to make recovery from Guru errors an even easier task. I've been told that, although it's possible to recover from a Guru alert, you need to be careful since any data you might try to save or recover may be damaged by the system crash that caused the error. Therefore, it is best to save the recovered data to a new file; never overwrite the original file until the data's integrity is tested.

Recently on local BBS and networks, I saw some of the same old babble being generated by Atari ST enthusiasts jealous over the Amiga's new popularity. They are trying to start rumors by telling everyone the Amiga has a buggy operation and that it Gurus all the time. What they are saying about the Amiga is simply an outright lie. I use the Amiga daily for a variety of tasks and have not seen a Guru in over 3 months. I'd also like to point out that the Amiga and its operating system is not the cause of Guru alerts. Rather, the alerts are caused by faulty programs written by programmers who have decided not to follow some basic Amiga programming rules. So, the next time someone tells you your Amiga is buggy, just ignore them. They will eventually fall back into the hole they came from. However, if physical violence is necessary...

Amiga Guru Meditation Number Reference Tables

Format of Guru Meditation Messages:

Subsystem ID	Gen. Error Msg.	Specific Error	Addr of Task
00	00	0000	00000000

Subsystem ID Codes:

CPU		Libraries		Devices		Reso.		Other	
CPU Trap	00	Exec	01	Audio	10	CIA	20	Bootstrap	30
(See Note on CPU Traps)		Graphics	02	Console	11	Disk	21	Workbench	31
		Layers	03	Gameport	12	Misc.	22	Diskcopy	32
		Intuition	04	Keyboard	13				
		Math	05	Trackdisk	14				
		Clist	06	Timer	15				
		DOS	07						
		RAM	08						
		Icon	09						
		Expansion	0A						

NOTE: *If the first digit of the subsystem ID is greater than three, there is no way to recover from the error. In these cases, subtract eight from the first digit to get the subsystem ID number.*

General Error Codes:

00	General Error Code Not Applicable
01	Insufficient Memory (Most Common Error)
02	MakeLibrary Error
03	OpenLibrary Error
04	OpenDevice Error
05	OpenResource Error
06	I/O Error
07	No Signal

Specific Alert Codes:

Exec Library

81000001	68000 Execption Vector Checksum
81000002	ExecBase Checksum
81000003	Library Checksum Error
81000005	No Memory to Make Library
81000006	Corrupted Memory List
81000007	InitaPtr
81000008	Semaphore Corrupt
81000009	Free Twice
8100000A	Bogus Exception

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Graphics Library

82010001	No Memory for Copper Display List
82010002	No Memory for Copper Instruction List
82000003	Copper List Overload
82000004	Copper Intermdeiate List Overload
82010005	No Memory for Copper List Head
82010006	Long Frame, No Memory
82010007	Short Frame, No Memory
82010008	No Memory for Flood Fill
82010009	Text, No Memory for TmpRas
8201000A	No Memory for BltBitMap
8201000B	Region Memory
82010030	MakeVPort
82011234	GfxNoLCM

Layers Library

83010001	LayersNoMem

Intuition Library

84000001	Unknown Gadget Type
04000001	Recoverable Version of Previous Message
84010002	No Memory to Create Port
84010003	Item Plane Alloc, No Memory
84010004	Sub Alloc, No Memory
84010005	Plane Alloc, No Memory
84000006	Item Box Top Less Than RelZero
84010007	No Memory to Open Screen
84010008	Open Screen, Raster Alloc, No Memory
84000009	Open Sys Screen, Unknown Type
8401000A	Add SW Gadgets, No Memory
8401000B	No Memory to Open Window
8400000C	Bad State Return Entering Intuition
8400000D	Bad Message Received by IDCMP
8400000E	Weird Message Causing Incomprehension
8400000F	Couldn't Open the Console Device

DOS Library

07010001	No Memory at Startup
07000002	EndTask Didn't
07000003	Qpkt Failure
07000004	Unexpected Packet Received
07000005	Freevec Failed
07000006	Disk Block Sequence Error
07000007	Bitmap Corrupt
07000008	Key Already Free
07000009	Invalid Checksum
0700000A	Disk Error
0700000B	Key Out of Range
0700000C	Bad Overlay

RAM Library

08000001	Bad Segment List

Expansion Library

0A000001	Bad Expansion Free

TrackDisk Device

14000001	Calibrate: Seek Error
14000002	Delay: Error on Timer Wait

Timer Device

15000001	Bad Request
15000002	Bad Supply

Disk Resource

21000001	Get Unit: Already has Disk
21000002	Interrupt: No Active Unit

Bootstrap

30000001Boot Code Returning an Error

NOTE: *CPU TRAPS (Execeptions) are defined by the 68000 CPU and not by the Amiga system software. There are 256 vectors for CPU exceptions. The lower 64 are hardware-defined, the upper 192 are user-definable interrupt vectors. Specific CPU Traps you might see in a Guru are:*

00000002	Bus Error
00000003	Address Error
00000004	Illegal Instruction
00000005	Divide-by-Zero
00000006	CHK Instruction
00000007	TRAPV Instruction
00000008	Privilege Violation
00000009	Trace
0000000A	Op Code 1010
0000000B	Op Code 1111

Other CPU Traps include Autovectors for different level interrupts, TRAP instruction vectors, and reserved traps.

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Product Guide Additions *and Corrections*

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Lattice C for AmigaDOS 5.0
Lattice C is a complete programming environment for the Amiga. Includes global optimizer, assembler, Blink overlay linker, disassembler, comprehensive documentation, and more. $300.00 *Lattice, Incorporated*

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This multiple preferences management tool lets you create, restore, edit, rename, sort, delete, or undelete all the preference settings you like. You can advance your printer paper to the top of the next page or toggle your Workbench screen between interlaced and non-interlaced mode instantly. $29.95 *Soft-Link, Inc.*

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Corrections

P. 33
Budgeteer
Budget preparation for home and business use. Uses the Amiga mouse, menu, and windowing environment to record actual and budgeted monthly expenses and credits. Data can be presented in tables, pie charts, or one of 36 bar charts, all of which can be output to any of the printers supported in Preferences. Requires 512K of RAM. Not copy-protected. $39.95
(previously listed as $395.00)
Prakticon, Inc.

P. 33
PHASAR
Financial record-keeping program. Provides savings and loan analysis, budget reports, projects and prepares income taxes. Includes full documentation and help screens. $99.95 *Antic Software*
(previously listed as Finally Technologies)

P. 63
Amix
A UNIX system V-compatible operating system. $399.95 *Kurta*
(previously listed as Lake Forest Logic, Inc.)

P. 64
GFA BASIC 3.0
BASIC for the Atari ST and MEGA computers has come to the Amiga. Features include over 300 commands, in-line C and assembler commands, extensive Amiga commands with submenus and built-in file requester, and run-time interpreter. $139.95 *Antic Software (previously listed as MicroDeal)*

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The AMICUS & Fred Fish Public Domain Software Library

This software is collected from user groups and electronic bulletin boards around the nation. Each Amicus disk is nearly full, and is fully accessible from the Workbench. If source code is provided for any program, then the executable version is also present. This means that you don't need the C compiler to run these programs. An exception is granted for those programs only of use to people who own a C compiler.

The Fred Fish disk are collected by Mr. Fred Fish, a good and active friend of the Amiga.

Note: Each description line below may include something like 'S-O-E-D', which stands for 'source, object file, executable and documentation'. Any combination of these letters indicates what forms of the program are present. Basic programs are presented entirely in source code format.

AMICUS Disk 1

ABasic programs: Graphics

3DSolids	3d solids modeling prog. w/sample data files
Blocks	draws blocks
Cubes	draws cubes
Durer	draws pictures in the style of Durer
FScape	draws fractal landscapes
Hidden	3D drawing program, w/ hidden line removal
JPad	simple paint program
Optical	draw several optical illusions
PaintBox	simple paint program
Shuttle	draws the Shuttle in 3d wireframe
SpaceArt	graphics demo
Speaker	speech utility
Sphere	draws spheres
Spiral	draws color spirals
ThreeDee	3d function plots
Topography	artificial topography
Wheels	draws circle graphics
Xenos	draws fractal planet landscapes

ABasic programs: Tools

AddressBook	simple database program for addresses
CardFile	simple card file database program
Demo	multiwindow demo
KeyCodes	shows keycodes for a key you press
Menu	run many ABasic programs from a menu
MoreColors	way to get more colors on the screen at once, using aliasing
shapes	simple color shape designer SpeakIt speech and narrator demo

ABasic programs: Games

BrickOut	classic computer brick wall game
Othello	also known as 'go'
Saucer	simple shoot-em-up game
Spelling	simple talking spelling game
ToyBox	selectable graphics demo

ABasic programs: Sounds

Entertainer	plays that tune
HAL9000	pretends it's a real computer
Police	simple police siren sound
SugarPlum	plays "The Dance of the Sugarplum Fairies"

C programs:

ATerm	simple terminal program, S-E
cc	aid to compiling with Lattice C
decvnt	opposite of CONVERT for cross developers
Dotty	source code to the 'dotty window demo
echox	unix-style filename expansion, partial S,O-D
fasterfp	explains use of fast-floating point math
FixDate	fixes future dates on all files on a disk, S-E
freedraw	simple Workbench drawing prog.,S-E
GfxMem	graphic memory usage indicator, S-E
Grep	searches for a given string in a file with
docs.	ham shows off the hold-and-modify method of color generation
IBM2Amiga	fast parallel cable transfers between an IBM and an Amiga
Mandel	Mandelbrot set program, S-E
moire	patterned graphic demo, S-E
objfix	makes Lattice C object file symbols visible to Wack, S-E
quick	quick sort strings routine
raw	example sample window I/O
setlace	turns on interlace mode, S-E
sparks	qix-type graphic demo, S-E

Other executable programs:

SpeechToy	speech demonstration
WhichFont	displays all available fonts

Texts:

68020	describes 68020 speedup board from CSA
Aliases	explains uses of the ASSIGN command
Bugs	known bug list in Lattice C 3.02
CLICard	reference card for AmigaDOS CLI
CLICommands	guide to using the CLI
Commands	shorter guide to AmigaDOS CLI commands
EdCommands	guide to the ED editor
Filenames	AmigaDOS filename wildcard conventions
HalfBright	explains rare graphics chips that can do more colors
ModemPins	description of the serial port pinout
RAMdisks	tips on setting up your RAM: disk
ROMWack	tips on using ROMWack
Sounds	explanation of Instrument demo sound file format
Speed	refutation of Amiga's CPU and custom chip speed
WackCmds	tips on using Wack

AMICUS Disk 2

C programs:

alib	AmigaDOS object library manager , S-E
ar	text file archive program, S-E
fixobj	auto-chops executable files
shell	simple CLI shell, S-E
sq, usq	file compression programs, S-E
YachtC	a familiar game, S-E
Make	a simple 'make' programming utility, S-E
Emacs	an early version of the Amiga text editor, S-E-D

Assembler programs:

bsearch.asm	binary search code
qsort.asm	Unix compatible qsort() function, source and C test program
setjmp.asm	setjmp() code for Lattice 3.02
SVprintf	Unix system V compatible printf()
trees.o	Unix compatible tree() function, O-D

(This disk formerly had IFF specification files and examples. Since this spec is constantly updated, the IFF spec files have been moved to their own disk in the AMICUS collection.)

John Draper Amiga Tutorials:

Animate	describes animation algorithms
Gadgets	tutorial on gadgets
Menus	learn about Intuition menus

AMICUS Disk 3

C programs:

Xref	a C cross-reference gen., S-E
6bitcolor	extra-half-bright chip gfx demo, S-E
Chop	truncate (chop) files down to size, S-E
Cleanup	removes strange characters from text files
CR2LF	converts carriage returns to line feeds in Amiga files, S-E
Error	adds compile errors to a C file, S
Hello	window ex. from the RKM, S
Kermit	generic Kermit implementation, flakey, no terminal mode, S-E
Scales	sound demo plays scales, S-E
SkewB	Rubik cube demo in hi-res colors, S-E

AmigaBasicProgs(dir)

Automata	cellular automata simulation
CrazyEights	card game
Graph	function graphing programs
WitchingHour	a game

ABasiC programs:

Casino	games of poker, blackjack, dice, and craps
Gomoku	also known as 'othello'
Sabotage	sort of an adventure game

Executable programs:

Disassem	a 68000 disassembler, E-D
DpSlide	shows a given set of IFF pictures, E-D
Arrange	a text formatting program, E-D

Assembler programs:

Argoterm	terminal program with speech and Xmodem, S-E

AMICUS Disk 4 Files from the original Amiga Technical BBS

Note that some of these files are old, and refer to older versions of the operating system. These files came from the Sun system that served as Amiga technical support HQ for most of 1985. These files do not carry a warranty, and are for educational purposes only. Of course, that's not to say they don't work.

Complete and nearly up-to-date C source to 'image.ed', an early version of the Icon Editor. This is a little flaky, but compiles and runs.

An Intuition demo, in full C source, including files: demomenu.c, demomenu2.c, demoreq.c, getascii.c, idemo.c, idemo.guide, idemo.make, idemoall.h, nodos.c, and txwrite.c

addmem.c	add external memory to the system
bobtest.c	example of BOB use
consoleIO.c	console IO example
creaport.c	create and delete ports
creastdi.c	create standard I/O requests
creatask.c	creating task examples
diskio.c	example of track read and write
dotty.c	source to the 'dotty window' demo
dualplay.c	dual playfield example
flood.c	flood fill example
freemap.c	old version of 'freemap'
geltools.c	tools for VSprites and BOBs
gfxmem.c	graphic memory usage indicator
hello.c	window example from RKM
inputdev.c	adding an input handler to the input stream
joystik.c	reading the joystick
keybd.c	direct keyboard reading
layertes.c	layers examples
mousport.c	test mouse port
ownlib.c, ownlib.asm	example of making your own library with Lattice
paratest.c	tests parallel port commands
seritest.c	tests serial port commands
serisamp.c	example of serial port use
prinintr.c	sample printer interface code
prtbase.h	printer device definitions
regintes.c	region test program
setlace.c	source to interlace on/off program
setparallel.c	set the attributes of the parallel port
SetSerial.c	set the attributes (parity, datartatspart the
singplay.c	single playfield example
speechtoy.c	source to narrator and phonetics demo
timedely.c	simple timer demo
timer.c	exec support timer functions
timrstuf.c	more exec support timer functions
WhichFont.c	loads and displays all available system fonts

process.i and prtbase.i assmebler include files:

autorqstr.txt	warnings of deadlocks with autorequesters
consoleIO.txt	copy of the RKM console I/O chapter
diskfont.txt	warning of disk font loading bug
fullfunc.txt	list of #defines, macros, functions
inputdev.txt	preliminary copy of the input device chapter

License information on Workbench distribution license

printer pre-release copy of the chapter on printer drivers, from RKM 1.1 v11fd.txt 'diff' of .fd file changes from version 1.0 to 1.1

v28v1.diff 'diff' of include file changes from version 28 to 1.0

AMICUS Disk 5 Files from the Amiga Link / Amiga Information Network

Note that some of these files are old, and refer to older versions of the operating system. These files are from Amiga Link. For a time, Commodore supported Amiga Link, aka AIN, for online developer technical support. It was only up and running for several weeks. These files do not carry a warranty, and are for educational purposes only. Of course, that's not to say they don't work.

A demo of Intuition menus called 'menudemo', in C source

whereis.c	find a file searching all subdirectories
bobtest.c	BOB programming example
sweep.c	sound synthesis example

Assembler files:

mydev.asm	sample device driver
mylib.asm	sample library example
mylib.i	
mydev.i	
asmsupp.i	
macros.i	assembler include files

Texts:

amigatricks	tips on CLI commands
extdisk	external disk specification
gameport	game port spec
parallel	parallel port spec
serial	serial port spec
v1.1update	list of new features in version 1.1
v1.1h.txt	'diff' of include file changes from version

Files for building your own printer drivers, including dospecial.c, epsondata.c, init.asm, printer.c, printer.link, printertag.asm, render.c, and wait.asm. This disk does contain a number of files describing the IFF specification. These are not the latest and greatest files, but remain here for historical purposes. They include text files and C source examples. The latest IFF spec is elsewhere in this library.

AMICUS Disk 6 IFF Pictures

This disk includes the DPSlide program, which can view a given series of IFF pictures, and the 'showpic' program, which can view each file at the click of an icon. The pictures include a screen from ArticFox, a Degas dancer, the guys at Electronic Arts, a gorilla, horses, King Tut, a lighthouse, a screen from Marble Madness, the Bugs Bunny Martian, a still from an old movie, the Dire Straits moving company, a screen from Pinball Contruction Set, a TV newcaster, the PaintCan, a world map, a Porsche, a shuttle mission patch, a tyrannosaurus rex, a planet view, a VISA card, and a ten-speed.

AMICUS Disk 7 DigiView HAM demo picture disk

This disk has pictures from the DigiView hold-and-modify video digitizer. It includes the ladies with pencils and lollypops, the young girl, the bulldozer, the horse and buggy, the Byte cover, the dictionary page, the robot and Robert. This includes a program to view each picture separately, and all together as separate, slidable screens. The 'seeilbm' program, to turn any screen into an IFF picture.

AMICUS Disk 8

C programs:

Browse	view text files on a disk, using menus S-E-D
Crunch	removes comments and white space from C files, S-E
IconExec	EXECUTE a series of commands from Workbench S-E
PDScreen Dump	dumps Rastport of highest screen to printer
SetAlternate	sets a second image for an icon, when clicked once S-E
SetWindow	makes windows for a CLI program to run under Workbench S-E
SmallClock	a small digital clockin a window menu bar
Scrimper	the screen printer in the fourth AC S-E

Amiga Basic Programs:

(**Note:** Many of these programs are present on AMICUS Disk 1. Several of these were converted to Amiga Basic, and are included here.)

AddressBook	a simple address book database
Ball	draws a ball
Cload	program to convert Compuserve hex files to binary, S-D
Clue	the game, Intuition driven
ColorArt	art drawing program
DeluxeDraw	the drawing program in the 3rd AC, S-D
Eliza	conversational computer psychologist
Othello	the game, as known as 'go'
RatMaze	3D ratmaze game
ROR	boggling graphics demo
Shuttle	draws 3D pictures of the space shuttle
Spelling	simple spelling program
YoYo	wierd zero-gravity yo-yo demo, tracks yo-yo to the mouse

Executable programs:

3Dcube	Modula-2 demo of a rotating cube
AltIcon	sets a second icon image, displayed when the icon is clicked
AmigaSpell	a slow but simple spell checker, E-D
arc	the ARC file compression progra must-have for telecom, E-D
Bertrand	graphics demo
disksalvage	prog. to rescue trashed disks, E-D
KwikCopy	a quick but nasty disk copy program: ignores errors, E-D
LibDir	lists hunks in an object file E-D
SaveILBM	saves any screen as IFF pic.E-D ??
ScreenDump	shareware screen dump prog, E only
StarTerm	version 2.0, term program, XmodemE-D

Texts:

LatticeMain	tips on fixing _main.c in Lattice
GDiskDrive	make your own 5 1/4 drive
GuruMed	explains the Guru numbers
Lat3.03bugs	bug list of Lattice C version 3.03
MForgeRev	user's view of the MicroForge HD
PrintSpooler	EXECUTE-based print spool prog.

.BMAP files:

These are the necessary links between Amiga Basic and the system libraries. To take advantage of the Amiga's capabilities in Basic, you need these files. BMAPs are included for 'clist', 'console', 'diskfont', 'exec', 'icon', 'intuition', 'layers', 'mathffp', mathieeedoubas', 'mathieeesingbas', 'mathtrans', 'potgo', 'timer' and 'translator'.

AMICUS Disk 9

Amiga Basic Programs:

FlightSim	simple flight simulator program
HuePalette	explains Hue, Saturation, & Intensity
Requester	ex. of requesters from Amiga Basic
ScrollDemo	demonstrates scrolling capabilities
Synthesizer	sound program
WorldMap	draws a map of the world

Executable programs:

Boing!	latest Boing! demo,with selectable speed,E
Brush2C	converts an IFF brush to C data instructions, initialization code, E
Brush2Icon	converts IFF brush to an icon, E
Dazzle	graphics demo, tracks to mouse, E
DeciGEL	assembler program for stopping 68010 errors, S-E-D
Klock	menu-bar clock and date display, E
life	the game of life, E
TimeSet	Intuition-based way to set the time & date
EMEmacs	another Emacs, more oriented to word processing, S-E-D
MyCLI	a CLI shell, works without the Workbench, S-E-D

Texts:

FnctnKeys	read function keys from Amiga Basic
HackerSln	explains how to win the game 'hacker'
Ist68010	guide to installing a 68010 in your Amiga
Boing!	latest Boing! demo,with selectablespeed, E
Brush2C	converts an IFF brush to C data instructions, initialization code, E
Brush2Icon	converts IFF brush to an icon, E
Dazzle	graphics demo, tracks to mouse, E
DeciGEL	assembler program for stopping 68010 errors, S-E-D
Klock	menu-bar clock and date display, E
life	the game of life, E
TimeSet	Intuition-based way to set the time date,
EMEmacs	another Emacs, more oriented to word processing, S-E-D
MyCLI	a CLI shell, works without the Workbench, S-E-D

Texts:

FnctnKeys	explains how to read function keys from Amiga Basic
HackerSln	explains how to win the game 'hacker'
Ist68010	guide to installing a 68010 in your Amiga
PrinterTip	sending escape sequences to your printer
StartupTip	tips on setting up your startup-sequence file
XfrmrReview	list of Transformer programs that work

Printer Drivers:

Printer drivers for the Canon PJ-1080A, the C Itoh Prowriter, an improved Epson driver that eliminates streaking, the Epson LQ-800, the Gemini Star-10, the NEC 8025A, the Okidata ML-92, the Panasonic KX-P10xx family, and the Smith-Corona D300, with a document describing the installation process.

AMICUS Disk 10 **Instrument sound demos**

This is an icon-driven demo, circulated to many dealers. It includes the sounds of an acoustic guitar, an alarm, a banjo, a bass guitar, a boink, a calliope, a car horn, claves, water drip, electric guitar, a flute, a harp arpegio, a kickdrum, a marimba, a organ minor chord, people talking, pigs, a pipe organ, a Rhodes piano, a saxophone, a sitar, a snare drum, a steel drum, bells, a vibrophone, a violin, a wailing guitar, a horse whinny, and a whistle.

AMICUS Disk 11

C programs

dirutil	Intuition-based, CLI replacement manager S-E
cpri	shows and adjusts priority of CLI processes, S-E
ps	shows info on CLI processes, S-E
vidtex	displays Compuserve RLE pics, S-E

AmigaBasic programs

pointered	pointer and sprite editor program
optimize	optimization ex ample from AC article
calendar	large, animated calendar, diary and date book program
amortize	loan amortizations
brushtoBOB	converts small IFF brushes to AmigaBasic BOB OBJECTS
grids	draw and play waveforms
hilbert	draws Hilbert curves
madlib	mad lib story generator
mailtalk	talking mailing list program
meadows3D	3D graphics program, from A C™ article
mousetrack	mouse tracking example in hires mode
slot	slot machine game
tictactoe	the game
switch	pachinko-like game
weird	makes strange sounds

Executable programs

cp	unix-like copy command, E
cls	screen clear, S-E
diff	unix-like stream editor uses 'diff' output to fix files
pm	chart recorder performances indicator

Assembler programs

cls	screen clear and CLI arguments example

Modula-2

trails	moving-worm graphics demo
caseconvert	converts Modula-2 keywords to uppercase
Forth	Breshehan circle algorithm example
Analyze	12 templates for the spreadsheet Analyze

There are four programs here that read Commodore 64 picture files. They can translate Koala Pad, Doodle, Print Shop and News Room graphics to IFF format. Getting the files from your C-64 to your Amiga is the hard part.

AMICUS Disk 12

Executable programs

blink	'alink' compatible linker, but faster, E-D
clean	spins the disk for disk cleaners, E-D
epsonset	sends Epson setttings to PAR from menu E-D
showbig	view hi-res pics in low-res superbitmap, E-D
speaktime	tell the time, E-D
undelete	undeletes a file, E-D
cnvapldhm	converts Apple][low, medium and high res pictures to IFF, E-D
menued	menu editor produces C code for menus, E-D
quick	quick disk-to-disk nibble copier, E-D
quickEA	copies Electronic Arts disks, removes protection, E-D
txed 1.3	demo of text editor from Microsmiths,E-D

C programs

spin3	rotating blocks graphics demo, S-E-D
popcli	start a new CLI at the press of a button, like Sidekick, S-E-D
vsprite	VSprite example code from Commodore, S-E-D
AmigaBBS	Amiga Basic bulletin board prog., S-D

Assembler programs

star10	makes star fields like Star Trek intro,S-E-D

Pictures

Mount Mandelbrot	3D view of Mandelbrot set
Star Destroyer	hi-res Star Wars starship
Robot	robot arm grabbing a cylinder

Texts

vendors	Amiga vendors, names, addresses
cardco	fixes to early Cardco memory boards
cinclude	cross-reference to C include files
mindwalker	clues to playing the game well
slideshow	make your own slideshows from the Kaleidoscope disk

AMICUS Disk 13

Amiga Basic programs

Routines from Carolyn Scheppner of CBM Tech Support, to read and display IFF pictures from Amiga Basic. With documentation. Also included is a program to do screen prints in Amiga Basic, and the newest BMAP files, with a corrected ConvertFD program. With example pictures, and the SaveILBM screen capture program.

Routines to load and play FutureSound and IFF sound files from Amiga Basic, by John Foust for Applied Visions. With documentation and C and assembler source for writing your own libraries, and interfacing C to assembler in libraries. With example sound.

Executable programs

gravity	Sci Amer Jan 86 gravitation graphic simulation, S-E-D

Texts

MIDI	make your own MIDI instrument interface, with documentation and a hi-res schematic picture.

AMICUS Disk 14

Several programs from Amazing Computing issues:

Tools

Dan Kary's	C structure index program, S-E-D

Amiga Basic programs:

BMAP Reader	by Tim Jones
IFFBrush2BOB	by Mike Swinger
AutoRequester	example
DOSHelper	Windowed help system for CLI commands, S-E-D
PETrans	translates PET ASCII files to ASCII files, S-E-D
C Squared	Graphics program from Scientific American, Sept 86, S-E-D
crlf	adds or removes carriage returns from files, S-E-D
dpdecode	decrypts Deluxe Paint, remo
ves copy	protection, E-D
queryWB	asks Yes or No from the user returns exit code, S-E
vc	VisiCalc type spreadsheet, no mouse control, E-D
view	views text files with window and
slider	gadget, E-D

Oing, Sproing, yaBoing, Zoing are sprite-based

Boing! style	demos, S-E-D

CLIClock, sClock, wClock are window border clocks, S-E-D

Texts

An article on long-persistance phospor monitors, tips on making brushes of odd shapes in Deluxe Paint, and recommendations on icon interfaces from Commodore-Amiga.

AMICUS Disk 15

The C programs Include:

'pr'	a file printing utility, which can print files in the background, and with line numbers and control character filtering.
'fm'	displays a chart of the blocks allocated on a disk.
'Ask'	questions an 'execute' file, returns an error code to control the execution in that batch file
'Stat'	an enhanced version of AmigaDOS 'status' command.
'Dissolve'	random-dot dissolve demo displays IFF picture slowly, dot by dot, in a random fashion.
'PopCLI2'	invoke new CLI window at the press of a key.

The executable programs Include:

'Form'	file formatting program through the printer driver to select print styles
'DiskCat'	catalogs disks, maintains, sorts,merges lists of disk files
'PSound'	SunRize Industries' sampled sound editor & recorder
'Iconmaker'	makes icons for most programs
'Fractals'	draws great fractal seascapes and mountain scapes.
'3D Breakout'	3D glasses, create breakout in a new dimension
'AmigaMonitor'	displays lists of open files,
memory use,	tasks, devices and ports in use.
'Cosmoroids'	version of 'asteroids' for the Amiga.
'Sizzlers'	high resolution graphics demo written in Modula 2.

Texts:

'ansi.txt'	explains escape sequences the CON: device responds to.
'FKey'	includes template for making paper to sit in the tray at the top of the Amiga keyboard.
'Spawn'	programmer's document from Commodore

Amiga, describs ways to use the Amiga's multitasking capabilities in your own programs.

AmigaBasic programs:

'Grids'	draw sound waveforms, and hear them played.
'Light'	a version of the Tron light-cycle video game.
'MigaSol'	a game of solitaire.
'Stats'	program to calculate batting averages
'Money'	"try to grab all the bags of money that you can."

AMICUS 15 also includes two beautiful IFF pictures, of the enemy walkers from the ice planet in Star Wars, and a picture of a cheetah.

AMICUS Disk 16

'juggler' demo by Eric Graham, a robot juggler bouncing three mirrored balls, with sound effects. Twenty-four frames of HAM animation are flipped quickly to produce this image. You control the speed of the juggling. The author's documentation hints that this program might someday be available as a product.

IFF pictures

parodies of the covers of Amiga World and Amazing Computing magazines.

C programs:

'Inputhandler'	example of making an input handler.
'FileZap3'	binary file editing program
'ShowPrint'	displays IFF picture, and prints it.
'Gen'	program indexes and retrieves C structures and variables declared in the Amiga include file system.

Executable Programs:

'FixHunk2'	repairs an executable program file for expanded memory
'ms2smus'	converts Music Studio files to IFF standard 'SMUS' format. I have heard this program might have a few bugs, especially in regards to very long songs, but it works in most cases.
'Missile'	Amiga version of the 'Missile Command' video game,

This disk also contains several files of scenarios for Amiga Flight Simulator II. By putting one of these seven files on a blank disk, and inserting it in the drive after performing a special command in this game, a number of interesting locations are preset into the Flight Simulator program. For example, one scenario places your plane on Alcatraz, while another puts you in Central Park

AMICUS Disk 17

Telcommunications disk whuch contains six terminal programs.

"Comm" V1.33	term prog. with Xmodem, WXmodem,
"ATerm" V7.2	term prog. includes Super Kermit
"VT-100"V2.6	Dave Wecker's VT-100 emulator with Xmodem,Kermit, and scripting
"Amiga Kermit"	V4D(060) port of the Unix C-Kermit
"VTek" V2.3.1	Tektronix graphics terminal emulator based on the VT-100 prog. V2.3 and contains latest 'arc' file compression
"AmigaHost"	V0.9 for Compuserve. Includes RLE graphics abilities & CIS-B file transfer protocol.
"FixHunk"	expansion memory necessity
"FixObj"	removes garbage characters from modem received files
"Txt"	filters text files from other systems to be read by the Amiga E.C.
"addmem"	executeable version for use with mem expansion article in AC v2..1
'arc'	file documentation and a basic tutorial on un 'arc'ing files
"arcre"	for makeing "arc" files E.C.

AMICUS Disk 18

Logo	Amiga version of the populacomputer language, with example programs, E-D
Tv*Text	Demo version of the TV*Text character generator
PageSetter	Freely distributable versions of the updated PagePrint and PageIFF programs for the PageSetter desktop publishing package.
FullWindow	Resizes any CLI window using only CLI commands, E-D
Life3d	3-D version of Conway's LIFE program, E-D
Deldisk	CLI utility to re-assign a new Workbench disk, S-E-D
Calendar.WKS	Lotus-compatible worksheet that makes calendars
SetKey	Demo of keyboard key re-programmer, with IFF picture to make function key labels, E-D
VPG	Video pattern generator for aligning monitors, E-D
HP-10C	Hewlett-Packard-like calculator, E-D
SetPrefs	Change the Preferences settings on the fly, in C, S-E-D
StarProbe	Program studies stellar evolution. C source included for Amiga and MS-DOS, S-E-D
ROT	C version of Colin French's AmigaBasic ROT program from Amazing Computing. ROT edits and displays polygons to create three dimensional objects. Up to 24 frames of animation can be created and displayed. E-D
Scat	Like Ing, windows on screen run away from the mouse, E-D
DK	Decays" the CLI window into dust, in Modula 2, S-E-D
DropShadow2	Adds layered shadows to Workbench windows, E-D

AMICUS Disk 19

This disk carries several programs from Amazing Computing. The IFF pictures on this disk include the Amiga Wake part T-shirt logo, a sixteen-color hi-res image of Andy Griffith, and five Amiga Live! pictures from the Amazing Stories episode that featured the Amiga.

Solve	Linear equation solver in assembly language, S-E-D
Gadgets	Bryan Catley's AmigaBasic Tutorial,
Household	Bryan Catley's AmigaBasic household inventory program, S-D
Waveform	Jim Shields' Waveform Workshop AmigaBasic, S-D
DiskLib	John Kennan's AmigaBasic disk librarian program, S-D
Subscripts	Ivan Smith's AmigaBasic subscript example, S-D
String, Boolean	C programs and executables for Harriet Maybeck Tolly's Intuition tutorials, S-E-D
Skinny C	Bob Riemersma's example for making small C programs, S-E-D
COMAL.h	Make C look like COMAL header file,
EmacsKey	Makes Emacs function key definitions by Greg Douglas, S-D
AMon 1.1	Snoop on system resource use, E-D
BTE	Bard's Tale character editor, E-D
Size	CLI program shows the size of a given set of files, E-D
WinSize	CLI window utility resizes current window, S-E-D

AMICUS Disk 20

Compactor, Decoder Steve Michel AmigaBasic tools, S-D

BobEd	BOB and sprite editor written in C,S-E-D
SpriteMasterII	Sprite editor and animator by Brad Kiefer, E-D
BlitLab	Blitter chip exploration C program by Tomas Rokicki, S-E-D
FPic	Image processing program by Bob Bush loads and saves IFF images, changes them with several techniques, E-D
Bankn	Complete home banking program, balance your checkbook! E-D

AMICUS Disk 21

Target	Makes each mouse click sound like a gunshot, S-E-D
Sand	Simple game of sand that follows the mouse pointer, E-D
PropGadget	Harriet Maybeck Tolly's proportional gadget example, S-E
EHB	Checks to see if you have extra-half-bright graphics, S-E-D
Piano	Simple piano sound program
CelScripts	Makes cel animation scripts for Aegis Animator, in AmigaBasic

This disk has electronic catalogs for AMICUS disks 1 to 20 and Fish disks 1 to 80. They are viewed with the DiskCat program, included here.

AMICUS Disk 22

Cycles	Light cycle game, E-D
Show_PrintII	Views and prints IFF pictures, including larger than screen
PrtDrvGen2.3	Latest version of a printer driver generator
Animations	VideoScape animations of planes and boing ball
Garden	Makes fractal gardenscapes
BasicSorts	Examples of binary search and insertion sort in AmigaBasic

AMICUS Disk 23

An AMICUS disk completely dedicated to music on the Amiga. This disk contains two music players, songs, instruments, and players to bring the thrill of playing "Big Sound" on your Amiga

Instruments	a collection of 25 instruments for playing and creating music. The collection ranges from Cannon to Marimba
List INSTR	program to list the instruments DMCS will not load as well as list the origins for any instrument.
Music	a collection of 14 Classical pieces
1812Overture	The 16 minute classical feature complete with Cannon!

Three Amiga Music Players:

SMUSPlay
MusicCraft2SMUS
MusicStudio2SMUS

AMICUS Disk 24

Sectorama	A disk sector editor for any AmigaDOS file-structured device, recover files from a trashed hard disk. By David Joiner of MicroIllusions
Iconize	Reduces the size of IFF images, companion program, Recolor, remaps the palette colors of one picture to use the palette colors of another. Using these programs and a tool to convert IFF brushes to Workbench icons, make icons look like miniatures of the pictures.
CodeDemo	Modula-2 program converts assembler object files to inline CODE statements. Comes with a screen scrolling example
AmiBug	Workbench hack makes the same fly walk across the screen at random intervals. Otherwise, completely harmless.
BNTools	Three examples of assembly language code from Bryce Nesbitt: 1. SetLace,prog to switch interlace on&off. 2. Why, replace AmigaDOS CLI Why 3. LoadIt, prog to load a file into memory until a reboot. (Only the most esoteric hackers will find LoadIt useful.)
Monolace	CLI program resets Preferences to several colors of monochrome & interlace screens. C source is included, works with DisplayPref, a CLI program which displays the current Preferences settings.
BoingMachine	A ray-traced animation of a perpetual motion Boing-making machine, includes the latest version of the Movie program, which has the ability to play sounds along with the animation. By Ken Offer
Daisy	Example of using the translator and narrator devices to make the Amiga talk. It is written in C.
QuickFlix	Script-driven animation and slideshow program flips through IFF images.
BMon	System monitor AmigaBasic program ; perform simple manipulations of memory.
Moose	Random background program, a small window opens with a moose resembleing Bullwinklesaying witty phrases user definable.
DGCS	Deluxe Grocery Construction Set, simple Intuition-based prog for assembling and printing a grocery list.

The Virus Check directory holds several programs relating to the software virus that came to the US from pirates in Europe as detailed in Amazing Computing V2.12. Bill Koester's full explanation of the virus code is included. One program checks for the software virus on a Workbench disk; the second program checks for the virus in memory, which could infect other disks.

AMICUS Disk 25

Nemesis	Graphics demo pans through space towards the mythical dark twin of the sun with wonderful music and space graphics.

The KickPlay directory holds text that describes several patches to the Kickstart disk. For Amiga 1000 hackers who feel comfortable patching a disk in hexadecimal, KickPlay offers the chance to automatically do an ADDMEM for old expansion memory, as well as the ability to change the picture of the "Insert Workbench" hand. A program is also included for restoring the correct checksum of the Kickstart disk.

KeyBird	BASIC prog edits keymaps, adjust the Workbench keymaps or create your own.

Fred Fish Disk 98

Access	16 color terminal program based on Comm V1.,34. Includes Macro window, custom gadgets, colorized menus, etc. V. Beta 0.18 by Keith Young ,comm by D.J.James. E.
Backup	Writes AmigaDos disks as the backup destin-ation. recover files from the backup disk. Requires manual decisions on disk structure. by Alan Kent SE
DCDemo	DishCat 2.3, a disk catalog program, demo limited to cataloging 100 files at a time. by Ed Alford, MicroAce Software
HdDriver	WD-1002-05 hard disk controller driver. Card capable of maintaining 3 hard disks and 4 floppies, the driver is capable of only one hard disk. by Alan Kent SED
QBase	Quick-Base, a "MailBase Management utility", define and maintain a maximum of 200 records per file. by Kevin Harrise E
Thai	Thai language quiz program. Speak or type english/Thai sentences from supplied file. by Alan Kent SE

Fred Fish Disk 99

A-Render	Version .3 a Ray- Tracing Construction Set for the Amiga Computer by Brian Reed ED

Fred Fish Disk 100

Berserk	Must see animation, by Leo Schwab
Conman	Console handler replacement, provides line editing and command line histories transparent to application prog uses CON: windows. Shareware V1.0 by W Hawes. E.
WBLander	Workbench display hack game, upgrade of "Rocket" on FF85, now with sound effects. By Peter da Silva. E

Fred Fish Disk 101

CirPlane	Circular plane generator for VideoScape3D. Generates a clockwise circular polygon with the specified number of vertibles. V1.0 by T Floryan SE
IconAssembler	Change Workbench Icons with IFF-brush files by Stefan Lindahl E
Microspell	Standalone spelling checker scans text files and reports errors. 1000 common word list, 43,000 word main dictionary with multiple user dictionary support. Interfaces with MicroEMACS 3.9 with an emacs macro to step through the source file, stopping at suspect words and allowing the user to option. V1.0 by Daniel Lawrence, SED
Midi	midi library and utility set. Includes Midi monitor, routing utility, status utility, and more. by Bill Barton SED
PsIntrp	Postscript Interpreter reads and previews files on screen. by Greg Lee S(assy)E
StartUps	Three C startup file replacements for standard Astartup.obj and LStarup.obj. Options include (1) BothStartup.obj, for the WorkBench programs or CLI programs with or without command line parameters. (2) WBStartup.obj, for WorkBench programs or CLI programs that require no command line parameters. (3) CLIStartup.obj for CLI programs that require command line parameters but do not need to be WorkBench runnable. by Bryce Nesbitt SE

Fred Fish Disk 102

Dbug	Machine independent macro based C de-bugging package. Update FF41. by F Fish profiling support by Binayak Banerjee SE
Match-stuff	Heavy duty text pattern matching stuff. includes simple match text replacement capability. By Pete Goodeve
Sectorama	Recover lost or damaged data from floppy or hard disks or repair a damaged volume. by David Joiner E
SiliCon	Smart input line interpreter with window for full editing. Upgrade FF50 by P Goodeve., E
Xicon	Use icons to call up scripts containing CLI commands. V2.0 upgrade of FF31.by Pete Goodeve E

Fred Fish Disk 103

AvlTrees	Library and test prog. implement routines for creating and using trees held in memory.S.
Calc	A programmable RPN calculator.
Cref	A C cross ref. prog. S.
DosKwik	A pair of progs. allows you to save files to one or more floppies for quick loading. Doesn't store Dos format.
IntuiDos	A prog. to improve control and handling of the material on all disks in 'CLI-area' .
MFF-Update	A text import util. for MicroFiche Filer (demo on FF 89) and updates to some PD disk library datatbases.
Pack-It	Takes all files the files and dirs. on a disk & packs them into a single file. for modem.
Sol	Amiga version of solitaire.

Fred Fish Disk 104

Analyticalc	Is a large and powerful spreadsheet prog.

Fred Fish Disk 105

AsmProgs	Misc. assembly tools. Includes some S.
BasicProgs	LeastSquare solves least square probs ,graphs results,S.
Bison	A replacement for unix "yacc" command. S.
Dmouse	Another prog in the tradition of display hacks". S.
FlamKey	Allows keyboard and mouse inputs to be locked until a password is entered.
GravityWars	Game of planets,ships &black holes, v2.0 ,FF84 update.
IPo2C	A util. to write a C-lang definition to mimic the intuition pointer.S
Pere-et-Fil	Ex. of creating & using reentrant processes. S.
Record Replay	Similiar to "Journal" v2.0 update to FF95.

Fred Fish Disk 106

Funckey	Shareware function key editor, v1.1update to FF89. Source avail. from author(Anson Mah).
MoreArt	A small selection of some Amiga artwork.
QuickFlix	An IFF slideshow and cel animation prog,v0.13.
RistiNolla	A Finnish game. Also called Go-Moku. v1.0

Fred Fish Disk 107

Csh	V2.07 of Matt Dillon's csh like shell.S.
Diff	A util.,similiar to other common "diff" programs.S.
ProSuite	Provides ex. code of facilities such as FileIO Requester, XText, DoRequest. & tutorial on how to program the Amiga. Book 1.01.S
SVTools	Some useful tools. S.

Fred Fish Disk 108

AList	Dir listing prog. based on LD4 prg S
DirMaster	Disk cataloger. v1.0b, update to FF89. S.
Dots-Perfect	Printer Driver for an Epson MX80 printer with upgrade kit installed. S.
MonIDCMP	Lets you monitor the IntuiMessages that pass through an IDCMP window. Prints the message class,mouse coordinates,qualifier values. Great for debugging. S.
PrintPop	A util. to send common control settings to PRT: S.
Sectorama	Utilities to recover lost or damaged data from floppies & hard disks. v1.1, an update toFF102.
Tek	Vt100 emulator for a Tektronix 4010/4014. (V2.6) update to FF52. S.
Zoo	File archiver, like "arc". v1.24B. update to FF87

Fred Fish Disk 109

Machine	A new animation.
SimCPM	A CP/M sim,simulates 8080 along with h19 emulationS.
UUpc	Hook up your Amiga as a usenet node. S.

Fred Fish Disk 110

A68k	A 68000 assembler written in C. S.
Pdc	An optimizing C compiler for the 68000 processor. update to FF53. but not based on that code.

Fred Fish Disk 111

AmyLoad	A graphical monitor of cpu, blitter, & memory use. Includes two components; load.device,monitors system parameters, & amyload, which is the user interface & display program. by Jeff Kelley SE
AssignDev	Assigns multiple names to a given device. modified version of the original released on disk number 79. By Phillip Lindsay, mod by Olaf Seibert SE
Gauge	Continuously displays memory usage in a vertical bar graph Binary only. By:Peter da Silva
HeliosMouse	Another "sunmouse"prog. Automatically activates a window by mouse pointer V 1.1, update to FF94. By:Davide Cervone SE
Labels	Alphabetic & numeric ordered cross reference lists of defined system constants. Recommended for debugging purposes only, use the symbolic values in progs! By:Olaf Seibert
Mandel	Mandelbrot generator program, with bits & pieces of code from C. Heath & R.J. Mical. By:Olaf Seibert S
PopLife	A PopCLI type that plays life all over your screen. Lots of bits & pieces from Tomas Rokicki's blitlab & John Toebes' PopCLI. By:Olaf Seibert S

Fred Fish Disk 112

BeachBirds	Beach scene portrayed by sprites & sound 512K machine. By:Jerrold Tunnell B only.
Bully	Pushes all open screens around (thus the name "bully"). Show more than one demo at a time By:Mike Meyer S
DropShadow	Dropshadow V2.0, use with Bryce Nesbitt's Wavebench demo. B only. By:Jim Mackraz
HagenDemos	"RGB" & "Focus". RGB requires one meg, B only. By:Joel Hagen
Viacom	Latest version of viacom for use in conjuction with WaveBench demo. B only. By:Leo Schwab & Bryce Nesbitt
WaveBench	A neat screen hack, & runs on 512K machines. For more laughs, try in conjunction with Viacom or Ds (Dropshadow). Includes S. By:Bryce Nesbitt

Fred Fish Disk 113

AmiCron	Simple Unix "cron" type program,a background task uses a disk-resident table to automatically run certain tasks on a regular basis, at specific times. V 2.3, S. By:Steve Sampson, Amiga port by Rick Schaeffer
Dme	V 1.28f of Matt's text editor. A simple WYSIWYG editor for programmers. Not a WYSIWYG word processor Features : arbitrary key mapping, fast scrolling, title-line statistics multiple windows, iconify windows,etc. Update to FF93, S. By:Matt Dillon
DosDev	Example DOS device driver in Manx C. Version 1.10, includes S. By:Matt Dillon
M2Amiga	Demo of M2Amiga. A fast single pass Modula-2 compiler with editor, linker, a small set of interface & standard libraries. Compiles only small demo programs by limiting codesize & imports. Further development of the ETHZ compiler on FF24. B only. Demos with Source. By:R. Degen, C. Nieder, M. Schaub, J. Straube (AMSoft)
NoIconPos	Clears position info of any icons, allows WorkBench to pick a new place for the icon. Useful for disk & drawer icons where Snapshot rewrites the icon & the window information. Modula-2, another demo for M2Amiga By:Markus. Schaub

Fred Fish Disk 114

CDecl	English to C (and vice versa) translator for C declarations, a must for anyone except possibly the most hardcore C guru. By:Graham Ross, S
Vt100	V2.7 of vt100 terminal emulator with kermit & xmodem file transfer. Includes a few bug fixes posted to Usenet shortly after the posting of v2.7. Update to FF55. Includes S. By:Dave Wecker
WBLander	a special version of the WBLander program from FF100. Ending is unique. Effective use of sound, Includes S. By:Peter da Silva & Karl Lehenbauer

Fred Fish Disk 115

Killer	Masterful Video commercial of the Amiga, Beatles music, requires one meg of memory to run. Binary only. By:R. Wilt
Marketroid	Another devious sprite oriented demo with lots of "in" jokes. 512K required, includes S. By:Leo Schwab

Fred Fish Disk 116

Movies	A ram animation system with three different example animations; Kahnankas, Rocker, & F-15. Kahnankas & Rocker run on a 512K Amiga & show off overscan HAM mode. Includes a animation player program (movie), animation builder programs (dilbm, pilbm), & a text/graphics display program (vilbm). By:Eric Graham & Ken Offer

Fred Fish Disk 117

AMUC_Demo	A really neat horizontal scrolling demo that is a 2400 x 200 pixel 32 color IFF picture composed of digiview snapshots of members of the AMiga Users of Calgary, superimposed on a very wide picture of the Calgary Skyline. B only. By:Stephen Vermeulen & Stephen Jeans
ExP_Demo	Demo version of Express Paint 1.1., used to create the scrolling demo picture in the AMUC_Demo drawer on thi disk. B only. By:Stephen Vermeulen

Fred Fish Disk 118

Empire	Complete rewrite, in Draco, of Peter Langston's Empire . A multiplayer game of exploration, economics, war, etc, can last months.Use local keyboard or modem.V1.0, shareware, & S . By:Chris Gray, original game by Peter Langston
HAMmmm	Displays lines whose end points are bouncing around the screen, which is a double buffered HAM screen. The Y positions of the points are continuously copied into an audio waveform and played on all four channels, & the pitch of a just intoned chord is derived from the average X position of these points. JForth. Source By:Phil Burk
Stars	Based on original code by Leo Schwab, credits longer than actual demo. Runs on 512K Amiga. B only. By:Hobie Orris
WireDemo	Demonstrates the Amiga's line drawing speed. Runs on a 512K Amiga. Includes S. By:Matt Dillon

Fred Fish Disk 119

MicroEMACS	V3.9e of Daniel Lawrence's variant of Dave Conroy's microemacs. Update to FF93. Also included, for the first time, is extensive documentation in machine readable form. SE. Author: Dave Conroy, Enhanced by Daniel Lawrence

Fred Fish Disk 120

Amoeba	Clone of Space Invaders, one of the PDS games for the Amiga. B only BY: LateNight Developments
BackGammon	Graphical Backgammon (an undergraduate A.I. course project). Version 1.0, S. By: Robert Pfister
Bankn	A complete checkbook system offered by the author as shareware. Version 1.3, binary only. By: Hal Carter
EgyptianRun	"road race + hazards" type game. Version 1.1, B only, shareware, source available from author. By: Chris Hames
IconImage	Replace an old icon image with a new image, without affecting icontype, drawer data, etc. SE. By: Denis Green

Fred Fish Disk 121

BasicStrip	AmigaBASIC prog. helps to convert programs written in other forms of Basic to AmigaBASIC. By: George Trepal
DataPlot	Shareware,AmigaBASIC, plotting program. Also includes a least squares curve fit program. By: Dale Holt
Plot	Shareware 3-D AmigaBASIC graphing prog. & sample output plots. Source available via author.By: George Trepal
Stairs	AmigaBASIC prog. demos a musical illusion based upon perceptual circularity of widely spaced tones whose volumes are defined as a sinusoidal relationship to their frequency. By: Gary Cuba
Uedit	V2.3 of this nice shareware editor. With learn mode, command language, menu customization, and other user configurability and customizability features. Binary only, shareware, update toFF60. By: Rick Stiles
WBColors	Prog to change Workbench colors for progs that expect to be booted off their distribution disk but are run from a hard disk. SE. Author: Stefan Lindahl

Fred Fish Disk 122

Asteriods	Asteroid game. The images and sounds are replaceable by the end user. Anything goes! By: Rico Mariani
Iff2Pcs	Interactive puzzle prog. takes any IFF file with up to 16 colors, and breaks it up into squares to make a puzzle which the user can then piece together. V1.0,S. By: Ali Ozer
Names	A shareware program to create and manage mailing lists. Binary only. By: Ernie Nelson
Pr	Utility to print listings in different formats. Similar to the Unix "pr" program. Includes source By: Samuel Paolucci
PushOver	Board strategy game, AmigaBASIC. Push your pieces onto the board until yfive in a row in any direction.S. By: R.Yost
PuzzlePro	Create a puzzle from an IFF picture, which the user can then piece back together again. AmigaBASIC. V1.0, B only, shareware, source available from author. By: Syd Bolton

Fred Fish Disk 123

Arp	ARP stands for "AmigaDOS Replacement Project". Arp is an effort led by Charlie Heath of Microsmiths Inc., to replace the current DOS in a compatible fashion, so that current programs will continue to work. Arp also makes whatever improvements are possible, so that current and future programs will work better. Various authors contributed work
Car	One of Allen's entries to the Badge Killer Demo Contest. It apparently is an inside joke relating to a well known Amigan's experience with a certain highend graphics hardware manufacturer. Author: Allen Hastings

Fred Fish Disk 124

Icons	Some sample animated icons. By: L. Pfost
Tarot	AmigaBASIC Nice graphic of tarot cards. Author: L.Pfost

Fred Fish Disk 125

ElGato	Animation entry to the BK D Contest. Background music arrangement, requires Sonix to use. By Kevin Sullivans

Fred Fish Disk 126

Colour	Manipulate the colors of specific named screens, saving current color sets to data files, loading new color sets from data files, or interactively changing colors. S. By J. Russell
Dance	Two programs, "dancing polygons", are entries to the BKD Contest. They aresimilar, but demonstrate the range of colors available on the Amiga. S. By: John Olsen
HBHill	Animation entry to the BDK Contest. First known animation using the "Extra Half Brite" mode. By: Kevin Sullivan
Iconify	Subroutine creates an icon on the Amiga screen that can be subsequently dragged around, and double-clicked on. You can use this to have your programs "iconify" themselves to temporarily get out of the user's way. With source & demo program. By Leo Schwab
OnlyAmiga	Animation entry to BDK Contest. Three balls being juggled by pyramids rotating on their tops. By Iqbal Singh Hans
Suplib	Support library needed to rebuild various programs of Matt's from source, including DME, DTERM, etc. S By Matt Dillon
VCheck	V1.2 of virus detection prog. from Commodore Amiga Technical Support.. Will test for the presence of a virus in memory, or on specific disks. B only. By: Bill Koester.

Fred Fish Disk 127

Bounce	Entry for BDK Contest. Creates little dots that bounce around and multiply. S By: Steve Hansel and Tom Hansel
Nemesis	Entry to BDK Contest. It is quite small for what it does, and won fifth place in the contest. B only. By Mark Riley
Ripples	Entries to BDK Contest. Unlike most other animations, it shows a fixed object from a moving point of view, instead of vice versa. By: Allen Hastings

Fred Fish Disk 128

Dis	68000 disassembler, written in assembler. S By Greg Lee
DropCloth	Place a pattern, a 2 bitplane IFF image or a combination of a pattern and image, into the WorkBench backdrop. Version 2.2, shareware, B By: Eric Lavitsky
LedClock	An extremely simple clock program, for interlaced screens only. S By: Ali Ozer
MRBackUp	Hard disk backup utility, does a file by file copy on AmigaDOS floppy disks. With an intuition interface & file compression. V1.3, Source. By: Mark Rinfret
Paint	Simple screen painting program, written in web. Requires web preprocessing program to rebuild from source. Includes source in web. Author: Greg Lee
PrtDriver	A printer driver for the Toshiba "3 in one" printer in its Qume (best) mode. Includes source in C and assembler. By: Rico Mariani
SDBackUp	A hard disk backup utility. CLI interface only. Does file compression. V 1.1, binary only. By Steve Drew
Sed	A clone of the Unix sed (Stream EDitor) program. Includes source. By: Eric Raymondw
Keys	A "hot-keys" program binds keyboard function keys to window manipulation functions (window activation, front to back, moving screens, etc). S By: Davide Cervone

Fred Fish Disk 129

DosKwik	A pair of programs which allow you to save files, or a group of files, to one or more floppies for quick loading, does not store files in DOS format, for speed. V2.0, update to FF103. B, Shareware. By: Gary Kemper
MRBackUp	A hard disk backup utility, does a file by file copy to standard AmigaDOS floppy disks. Includes intuition interface & file compression. V2.0 (with sources) and 2.1 (binary only, source available from author). Update of FF128. By Mark Rinfret
PaintJet	HP PaintJet printer driver from HP sources.
Patch	Two independent ports of Unix utility "patch", which applies context diffs to text file to automatically update them. Patch V 1.3 was ported to the Amiga by Rick Coupland and patchV2.0 was ported by Johan Widen. S By: Larry Wall

Fred Fish Disk 130

DirMaster	Shareware disk cataloger, V1.1, update of FF108, new features and enhancements. B only. By Greg Peters
Evo	Human evolution toy/tutorial with source.By S. Bonner
Hp	RPN calculator prog. supports calculations with binary, octal, decimal, hex, float, and complex numbers. Includes 32 registers for storing data & transcendental functions. V1.0, S By: Steve Bonner
Mach	"mouse accelerator" prog. with hotkeys, features of sun mouse, clicktofront, and popcli, a title bar clock with a bbs online charge accumulator, etc.V1.6a, S By: Brian Moats
PatEdit	A pattern editor for creating patterns to input to the Amiga SetAfPt macro call. Call sets the area fill pattern for the area filling graphics (RectFill, AreaDraw, etc). Includes source. By Don Hyde
QMan	Mandelbrot generator written partially in assem. for speed. Includes source. By Steve Bonner

Fred Fish Disk 131

Dfc	Copies disks like Maurader, but multitasks. Replaces diskcopy and format (smaller than either). Intuition interface. S By: Tomas Rokicki
HyperBase	Shareware database management system. V1.6, Binary only, source available from authors. FF58 update. By: Michael MacKenzie, Marc Mengel, & Craig Norborg
Life	A new version of Tomas's ancient Life game, with a new macro language for setting up patterns, good examples, S By: Tomas Rokicki
Mackie	A Popcli replacement that draws pretty lines on the screen in blanking mode. Includes source. Author: Software Distillery; enhancements by Tomas Rokicki
Mg1b	A version of Mg1b with an ARexx port and other improvements by Tomas Rokicki. Define macros & bind them to function keys in startup file. Includes source. Author: Various; enhancements by Rokicki
WFrags	Another version of Frags, Pops up a little window that updates occasionally. Good for developers to monitor what progs. are doing to memory. S By: Tomas Rokicki

Fred Fish Disk 132

Berserk	Animation, a "must see" for every Amiga user, and ranks with "Juggler" as a premier demo for the Amiga. The difference between this distribution, and FF100, this one includes "source". use it as an example for creating animations. Fred Fish felt it was appropriate to have at least one animation that was available at the "source code" level. Author: Leo Schwab

Fred Fish Disk 133

Conman	Shareware replacement for the standard console handler, provides line editing and command line histories completely transparent to any application program that uses CON: windows. V1.1, binary only, updateoFF100. New features include additional editing keys, fast search keys, undo key, clear history command, and more. Author: William Hawes
Crc	Two programs useful for generating 16-bit CRC listings of the contents of disks, and verifying that a given disk's files still compute to the same CRC's as listed. V1.0, binary only. By: Don Kindred
CrcLists	Complete CRC check files for FF1-128 using the Crc program included on this disk. These were made directly from Fred's master disks. Author: Fred Fish
Overscan	Patches the Intuition library so that sizable windows with MaxHeight of 200 (400 in interlace) and screens with Height of 200 (400 in interlace) will take advantage of the PAL overscan capability of Intuition V1.2. Useful only for European users who wish to run software written for the US market, without modifying the applications, but still using the additional space. S By Ari Freund

Fred Fish Disk 134

BoingThrows	50 frame HAM animation done with Sculpt-3D, and DigiPaint. The animation took about 325 hours of runtime to generate. By Marvin Landis
Browser	Workbench tool, using text-only windows, makes all files in the system accessible for executing, copying, moving, renaming, deleting, etc. Billed as a "programmers workbench". V1.2, binary only. BY Peter da Silva
Dme	V1.29 of Matt's text editor. Simple WYSIWYG editor designed for programmers. Arbitrary key mapping, fast scrolling, title-line statistics multiple windows, & ability to iconify windows. FF113 update,S. By Matt Dillon

Find	Utility searches for files that satisfy a given boolean expression of attributes, starting from a root pathname and searching recursively down through the hierarchy of the file system. Like the Unix find program. V1.0, includes source. By Rodney Lewis
Library	Demo version of a shareware program that stores textual information without regard to structure or content, and allows complicated searching for specific patterns. , B only. By: Bill Brownson
SmartIcon	Shareware Intuition objects iconifier. V1.0 is limited to iconifying windows, adds a new "iconify gadget" to each window, when clicked, iconifies the window into an icon in the ram: disk. B only, source available from author. By: Gauthier Groult

Fred Fish Disk 135

TeXF	A selection of 78 TeX fonts, with a conversion program to convert them to Amiga fonts. 22 different fonts at various sizes, ranging from 15 pixels high to more than 150 pixels. Conversion program can also be used with the fonts distributed with AmigaTeX, yielding an additional 1000+ fonts for use withother Amiga programs. V2.5, binary only. By: Ali Ozer

Fred Fish Disk 136

AsmToolBox	Assembler "toolbox" created to make interfacing between assembler programs and AmigaDOS easy. With source. By Warren Ring
Bison	A replacement for unix "yacc" command. From the GNU (GNU is Not Unix) effort. Port of the latest GNU version, by William Loftus, with the goal of preserving all of bison's current features. Includes source & test pro. "calc". By: Bob Corbett and Rich& Stallman.
Iff2Pcs	Interactive puzzle progr. takes any IFF file containing up to 16 colors, and breaks it into squares to make a puzzle the user can then piece back together again. V1.1, update of FF122, includes source. By Ali Ozer
Paste	Version of the Unix paste utility. Paste concatenates corresponding lines of the specified files into a single output line (horizontal or parallel merging) or concatenates them into alternate lines (vertical or serial merging). S. By: David Ihnat
YaBoingII	Game prog. demonstrating hardware sprite usage, including collision detection. Update of FF36. S. By: Ali Ozer, based on original by Leo Schwab
Zoo	File archiver, like "arc" in concept, but different in implementation and user interface details. Includes features that "arc" lacks (such as file/path names up to 255 characters in length). V 1.71, update of FF108. B. By: Rahul Dhesi, port by Brian Waters

Fred Fish Disk 137

Ct	Program to display images from a CT scanner, along with several interesting sample images of scans of real people, including a skull, brain, heart, and spine. Each image is 256 by 256 pixels in 2048 gray scale. The display software, a primitive user interface, is quite powerful, including functions like convolutions, averaging, laplacians, unsharp masking, edge detection, gradients, etc. Binary. by: J. Harman
JeansIcons	Miscellaneous cute icons created for AMUC's monthly newsletter disk. Submitted by Stephen Vermeulen. Author: Steve Jeans
Muncho	A cute little program which plays a digitized sound sample when you insert or remove a disk from your drive. If you don't like the sounds, you can replace them with your own. Binary only. By: Andrew Werth
Sit	Update to the Set Icon Type prog. on FF107. V1.10, includes source. Author: Stephen Vermeulen
VGad	A new gadget editor that takes two pictures of the window and its gadgets, one being the normal gadget state and the other being the fully selected state, then merges the data and converts to C source code. V1.0, binary only. Author: Stephen Vermeulen
VirusX	A boot sector virus check program that runs in the background and automatically checks all inserted disks for a nonstandard boot sector. Such disks can optionally have their boot sector rewritten to remove the virus. Includes source. Author: Steve Tibbett
VLabel	Program to print fancy customized disk labels. Combines an IFF picture and up to 50 lines of text (which may be placed arbitrarily in any font or point size) then print the result. The IFF picture can be virtually any size (up to 1008 by 1000). It will also print labels from a batch file produced by SuperBase. V1.20, binary only. By: Stephen Vermeulen

Fred Fish Disk 138

AmigaLine	A series of various technical notes for Amiga programmers. By: Byrce Nesbitt
Diff	Uses the same algorithm as the Unix diff program and also produces context diffs, suitable for use with patch. Binary only. By: Unknown (Decus C diff?)
Foreach	A simple but useful program that expands a wild card file specification and then invokes the specified command once per expanded filename, with the expanded filename as the command argument. Includes source. Author: Jonas Flygare
MacFont	A conversion tool to convert Mac fonts to Amiga fonts. Binary only. By: John O'Neill and Rico Mariani
ModulaTools	Various useful routines for those using in Modula on the Amiga. Update to FF94, S . By: Jerry Mack
Vt100	Two new versions of Dave's vt100 terminal emulator. One version, based on vt100 2.6, has been enhanced by John Barshinger to include an iconify feature, add full 132 column support using overscan, and other features (binary only). The second version is release 2.8 of the main-stream version of vt100, as enhanced and supported by Tony Sumrall. S. By: Dave Wecker

Fred Fish Disk 139

AmiCron	An enhanced and debugged version of AmiCron 2.3 from FF113. Includes source. By: Steve Sampson, Rich Schaeffer, Christian Balzer
ListScanner	A nice little utility to display all the Exec lists. Simular to Xplor utility FF73. Includes source in assembler. By: Heiko Rath
ProCalc	Simulates HP-11C programmable calculator. Both English & German versions. Shareware, B only. By: Gotz Muller
RemLib	Removes a specified library (if currently unused) or displays some info on all available libraries. Source in assembler. By: Heiko Rath
TurboBackup	A fast mass floppy disk duplicator with enforced verify mode to prevent errors. V1.0, binary only. By: Steffen Stempel and Martin Kopp
WArranger	Sends a window, identified by its name, to the front or back, without selecting it. Useful with AmiCron. Works on all screens. Includes source in assembler. By: Heiko Rath
WheelChairSim	A wheelchair simulator developed as a project for the Technical Resource Centre and the Albert Children's Hospital, to allow the matching of a wheelchair joystick to a child's handicap and allow the child to practice using the chair in a safe (simulated) environment. Binary only. Author: Unknown, submitted by Dr. Mike Smith

Fred Fish Disk 140

SBProlog	Volume 1 of the 2 volume Stony Brook Prolog (SBP) distribution, V2.3.2. This volume contains the executables and libraries. Volume 2, on FF141, contains the C and Prolog Source. By: Logic Programming Group at SUNY, Stony Brook Amiga port by David Roch & Scott Evernden

Fred Fish Disk 141

SBProlog	Volume 2 of the 2 volume Stony Brook Prolog (SBP) distribution, version 2.3.2. Volume 2 contains the C and Prolog source code. Volume 1, on FF140. By: Logic Programming Group at SUNY, Stony Brook Amiga port by David Roch and Scott Evernden
SmallC	An Amiga port of the Small-C compiler, written by Ron Cain and published in Dr. Dobb's Journal, in about 1980. Small-C is a rather small subset of the full 'C' language. It is capable of compiling itself, and other small, useful programs. Requires an assembler and linker to complete the package and produce working executables. Source and binary. By: Ron Cain. Amiga port by Willi Kusche.

Fred Fish Disk 142

Diff	Program uses same algorithm as Unix diff prog. and produces context diffs, suitable for use with patch.Same as FF138, but now includes the missing files (including source code). Author: Unknown (Decus C diff)
FracGen	Generates fractal pictures from "seeds" you create. Unlike any of the other "fractal generators", it can be used to load and display previously created fractal pics, modify existing fractals, or create your own fractals. V1.1, B. By:D.Houck
SciSubr	Scientific Subroutine Package from DECUS, ported to the Amiga to run with Absoft Fortran. A valuable resource of mathematical and statistical source code for those doing Fortran work on the Amiga. Author: Unknown; ported to the Amiga by Glenn Everhart

Fred Fish Disk 143

Rim	RIM-5 (Relational Information Manager), a full relational DBMS suitable for VERY large databases using B-Tree data storage, crude (by today's standards) user interface, but full source code is provided. RIM runs on a wide variety of systems, small and large, and produce compatible databases. Includes a built in HELP database and a programming language. Full Fortran source & documentation included. by: Various, Amiga port by Glenn Everhart

Fred Fish Disk 144

AnalytiCalc	V22-3D of Glenn Everhart's large and powerful spreadsheet program, update to FF104. Extra features "to have some pretentions of acting as an 'integrated system'. A virtual memory system supporting up to18000 columns and 18000 rows, multiple equations per cell, an outlining system, built-in cell annotation, and datafile access from any cell(s) of the sheet, plus an array of functions not present in most commercial spreadsheets. Source and documentation in arc'd form.

Fred Fish Disk 145

Csh	Modification of csh like shell to provide file name completion and argument execution. Requires ARP 1.1. Binary only, but includes diffs for the reference 2.07 source base. Author: Matt Dillon; enhancements by Johan Widen
DMouse	Versatile screen blanker, mouse blanker, auto window activator, mouse accelerator, popcli style programmable command key, pop window to front, push window to back, etc, widget. Very useful program! . V1.06, includes source. Author: Matt Dillon
Net	Link protoco provides essentially an unlimited number of reliable connections between processes on two machines, where each can be either an Amiga or a Unix (BSD4.3) machine. Works on the Amiga with any EXEC device that looks like the serial.device. Works on UNIX with tty and socket devices. Achieves better than 95% average throughput on file transfers. V1.20, includes sources for both the Amiga and Unix versions. Author: Matt Dillon
Tab	Tablature writing program, with intruments for a banjo and string guitar. Binary only. Author: Jeff deRienzo
TinyProlog	VT-PROLOG is a simple prolog interpreter provided with full source code to encourage experimentation with the PROLOG language and implementations. Version 1.1, includes source. Author: Bill and Bev Thompson

Fred Fish Disk 146

Blanker2	A screen blanking program that turns the screen black after 90 seconds of keyboard and mouse inactivity. V1.27.88, includes source. Author: Joe Hitchens
C-Light	A demo copy of a commercial ray tracing program, identical to commercial version but limited to ten objects per scene. Binary only. Author: Ronald Peterson
CrcLists	Complete CRC check files for FF129-141 and FF143-145 of the library, using the crc program from FF133. Made directly from Fred's master library. FF142 omitted due to a problem with the crc program. by: Fred Fish
DmeMacros	A set of DME macros which utilize templates to turn DME into a language-sensitive editor for C, Pascal, Modula-2, and Fortran. By Jerry Mack
MemoPad	A shareware intuition-based memo reminder program. Nicely done. V1.1, binary only. by: Michael Griebling

Fred Fish Disk 147

MicroGNUEmacs MicroGNUEmacs(MG 2b) contains many additions and enhancements since the original works by Dave Conroy (credit belongs to all contributors and Beta testers. Note: Amiga specific source code files and the document files have been archived. An executable copy of the PDS archive program "Zoo" is in the "c" directory

Fred Fish Disk 148

EFJ	"Escape from Jovi" A machine-code game featuring hi-res scrolling, large playfield, disk-based Hi-Score list, stereo sound, and multiple levels. Use a joystick in port 2 to control the ship. B, shareware ($8). By: Oliver Wagner
Fme	Nicely done map editor for the Fire-Power (tm) game. Features interlaced hi-res with intuition interface. See the "Readme.fnf" file for information on making a bootable disk. Includes source. Author: Gregory MacKay
HandyIcons	Adds a menustrip to the WorkBench window that allows you to run selected Workbench Tools by menu selection. Can be set up to provide custom environments. Current version supports only WorkBench Tools and not Projects. Binary by: Alan Rubright
Scrambler	A simple program that will encode/decode a text file into illegible gibberish, which resembles executable code, to evade prying eyes. Version 0.01, Binary only. Author: Foster Hall

Fred Fish Disk 149

AnimalSounds	A sample of digitized animal sounds along with a simple sound player. Authors: The Trumor Company, Inc. Sound Player by Don Pitts
DX-VoiceSorter	Written to be used with Jack Deckard's VoiceFiler program. (Disk 82). It allows for the sorting of a number of voicefiles stored using that program into a new voicefile of voices made up from various files. Includes source. Author: David Bouckley
Keep	A nice little utility program with an intuition interface for BBS and network junkies who download messages in one large file and then read them off-line. Using only the mouse, you can drive through such files a message at a time, examine each at your leisure and tag those you wish to keep. Version 1.2, binary only, but source available with donation to author. Author: Tim Grantham
Less	Like Unix "more", only better, with forward and backward scrolling, searching and positioning by percent of file and line number, etc. Now lets you also print the current file. Very useful! This is Amiga version 1.3, an update to the version on disk number 92. Includes source. Author: Mark Nudelman, Amiga port by Bob Leivian
Scheme	"Scheme is a statically scoped and properly tail-recursive dialect of the Lisp programming language invented by Guy Lewis Steele Jr. and Gerald Jay Sussman." Binary only. Amiga port by Ed Puckett

Fred Fish Disk 150

AirFoil	An update to the Airfoil generator on disk #71. Generates airfoil models as well as their corresponding streamline and pressure distributions. Includes source. Authors: Russell Leighton Addendum by David Foster
DC10	An AmigaBasic DC-10 instrument flight simulator. Appears to be quite in-depth with flight-planning and take-off options along with an extensive documentation file. Requires rebuilding on a separate disk and was successfully done so by following the author's instructions in the ReadMe_First file. Author: Jan Arkesteijn
ExecLib	A working example of how to build and use user-defined disk-resident libraries. Of special interest to developers working with Lattice C. Author: Alex Livshits
Iconizer	A utility program that saves your current mouse pointer to a small icon. You can restore the pointer just by double-clicking on its icon. Allows for building a whole library of pointers and to use them whenever you want. Binary only. Author: Alex Livshits
Pilot	An implementation of the PILOT language for the Amiga, including a demo done for the National Park Service. PILOT is a limited use language for use in educational and computer based instruction programs. Binary only with Beta test kit available from authors. By: T. LaGrone
StealMemBoot	A small utility designed to be a direct replacement for NoFastMem kind of programs. It modifies the boot block of a disk, so when you boot with it, all memory allocations will return only CHIP memory. Author: Alex Livshits

Fred Fish Disk 151

GlobeDemo	Graphics demo displays very smooth transitions of the rotating earth. Pop-up menu. Source. by: Bob Corwin
Icons	Yet another potpourri of interesting icons to choose from if you need one for your own program. by: Dave Turnock
Pcopy	A small intuition-based disk copier similiar to the resident "DiskCopy" except with write-verify and other user-selectable options. Useful for making multiple copies with reliable data. Requires two disk drives. S. by: Dirk Reisig
SCT	A CLI-based utility (SetColorTable) for displaying and/or setting a screen's colors. Save the colors of a screen to be restored later, or copy one screen's colors to another. Includes source. Author: aklevin
SlideShow	Very nicely done slide-show program written in assembly language. Features forward/backward presentation and creative screen wipes. Currently works only with IFF lo-res pictures. Executable only along with some new IFF pictures to have come my way. Shareware ($16). Authors: Mike McKittrick and Sheldon Templeton
Surveyor	A little utility that opens a window on the current screen and displays information about the pointer. Allows for absolute or relative measurement between two points on the screen. Very handy for precise positioning of icons and such. Includes source. Author: Dirk Reisig

Fred Fish Disk 152

Blk	A requester making tool employing various recursive algorithms including a recursive parser. It takes input text files and converts them to C-source for including as requester declarations. Includes source. Author: Stuart Ferguson
RunBack	A variant of Rob Peck's RunBackGround program from disk number 73. Allows you to start a new CLI program and run it in the background, then closes the new CLI. This version automatically searches the command-search-path to find the program. Source. By Daniel Barrett
UUCP	This is a version of uucp (Unix to Unix Copy Program) for the Amiga, along with some miscellaneous support utilities like cron, mail, and compress. Includes source. Author: Various, submitted by William Loftus

Fred Fish Disk 153

Dme	Version 1.30 of Matt's text editor. Dme is a simple WYSIWYG editor designed for programmers. It is not a WYSIWYG word processor in the traditional sense. Features include arbitrary key mapping, fast scrolling, title-line statistics multiple windows, and ability to iconify windows. Update to version on disk number 134, includes source. by: Matt Dillon
HP11	Emulates an HP11C calculator including the program mode. Features an ON/OFF button that turns the calculator into an icon that will sit and wait until you need it again. Documentation on the features is scarce, perhaps some industrious HP owner could write a small tutorial for the benefit of those that don't own an HP calculator. Binary only. Author: David Gay
HPMam	A program to manipulate settings and fonts on HP LaserJet+ printers and compatibles. Includes an Intuition interface and some sample picture files. Version 1.0, binary only, shareware. by: Steve Robb
Synthemania	An interesting, very small (and very persistent!) musical piece. If you plan on stopping it without using three fingers, you better read the document file first! Binary only. by: Holger Lubitz

Fred Fish Disk 154

Ada	An Ada Syntax checker for the amiga. Includes lex and yacc source. Author: Herman Fischer; updates by William Loftus
AssemblyDemos	A interesting group of assembly language demos for your visual and aural pleasure. Binary only. by: Foster Hall
DiskLib	Two utilities for those people who like to split up PD disks into disks of different categories. Includes source. by: Wilson Snyder
Guardian	Another virus diagnosing and vaccination program. Recognizes any non-standard bootblock. Includes a small utility program to permanently place the program on a copy of your kickstart disk in place of the seldom (if ever!) used Debug() function. Binary only. by: Leonardo Fei
PrintSpool	A print-spooling program. Very useful for printing files in the background. Many command-line options. Version 1.0.0, Includes source. Author: Frangois Gagnon
Utilities	A group of four little utility programs:
UnDelete	- Undelete a file from floppy (DF0:) to any device you request, checks for a disk in the drive and allows you to abort cleanly with a CTRL 'C'.
WhereIs	- Looks for a file and or directory defaults to the current device
CAL	- Clone of the Unix CAL , dates fromyear 1 to 9999.
DClock	Simple title bar clock/memory gauge with pop to front.
VirusX	An update to the virus-detecting program of the same name on disk number 137. This version also checks for the Byte-Bandit strain. Version 1.21, Includes source. by: Steve Tibbett
Virus_Alert!	Yet another anti-virus program with a twist. Once installed a message is displayed just after a warm or cold boot notifying the the user that the disk and memory are virus-free, and forcing a mouse-button press before continuing. Anything writing to the bootblock thereafter will destroy the message and a normal virus- infected boot (???) will take-place. Versions 1.01 and 2.01, Binary only. by: Foster Hall
Wicon	A "Window Iconifier". Allows you to turn your windows into small icons which can be later recalled. Currently installed with MacWin to give your windows a "rubber-banding" effect. Version 1.14, Includes source. by: Steven Sweeting Introducing the Amiga

Fred Fish Disk 155

AsmExamples	A couple of assembly code examples. Executables are not extremely useful but the code might be of considerable benefit to beginning assembly languageprogrammers. by: Henrik Clausen
Bison	A replacement for unix "yacc" command. From the GNU (GNU is Not Unix) effort. Contains updates to the version on disk number 136, submitted by two separate sources. Includes source. by: Bob Corbett and Richard Stallman, updates by William Loftus & Scott Henry
NoSmoking	Sample program showing the use of a recoverable alert while displaying a personal health message. Includes source. Author: Theo Kermanidis
Scenery	A very nice assembly language random scenery generator. Generates very realistic looking landscapes. Includes intuition interface and lots of menu options. V. 1.0, binary only by; Brett Casebolt

Fred Fish Disk 156

Blocks2	Amusing and colorful display of a moving trail of"blocks". Update to version on disk number 71, however this version also Source. by: Gary Walker
Flex	Flex is a replacement for the UNIX "lex" (lexical analyzer generator) program that is faster than lex, and freelyredistributable. Includes source. Authors: Jef Poskanzer, Vern Paxson, et. al. Submissions by William Loftus and Scott Henry
Go64	Another screen hack aimed at an earlier Commodore product (Not to be confused with the commercial product Go-64! fromSoftware Insight Systems). Includes source. by: Joerg Anslik
Grammars	A group of lexical grammar files for Ada, C and Pascal for use in conjunction with the flex program on this disk and thebison program on disk #155 by: Various, submitted byWilliam Loftus
OOPS!	Tired of the monochrome background color of your Workbench or CLI? Then try this colorful screen hack to brighten things up!Includes source. by Joerg Anslik

Fred Fish Disk 157

60or80	A small utility to toggle the 60/80 column text modes without having to go through preferences. Works from either the CLI or the Workbench. S by: Mark Schretlen
AmicForm	Creates a phonebook containing only those areacodes and exchanges reachable through PC-Pursuit. Input any of Chet Solace's Finalist BBS lists and it creates the phonebook in a form usable byAmicTerm other popular terminal programs.V. 1.3, Binary only. by: J. Motsinger
AnimBalls	A nifty little animation program that allows you to create a collection of balls in three-space and then interactively rotate them in real time using the mouse. Includes source.by: Jim Guilford

BootBack	A handy little utility to copy and save the boot block from a disk, then later restore it should the disk get stomped on by some ugly virus. Source. by: David Joiner
ECPM	A CP/M emulator for the Amiga.Emulates an 8080 along with H19 terminal emulation. Update from version on disk number 109.Source.by: Jim Cathey; port by Charlie Gibbs; Significant improvements by Willi Kusche
KeyFiler	BBS message file sorter that allows sorting by keyword. Includes a textreader, Soundex matching, and limited wildcardcapabilities. V. 1.0, Binary only.by: J. Motsinger
ScreenZap	A little utility to clean away screens that are left by illbehaving programs. It will kill every screen behind the WorkBench, noting how many it gets. The screens in front of WB are not affected. Source. by: Lars Clausen
SetPrefs	Allows you to build a whole library of preference settings and instantly switch back and forth between them. Affects allpreference settings not just the colors. Very useful for machines with multiple users or multiple external devices. Includes Amiga's default and various sample preference settings. B only. by: Martin Hippele
Xicon	Xicon lets you use icons to call up scripts containing CLI commands. This is version 2.01, an update to FF102. Includes source. by: Pete Goodeve

Fred Fish Disk 158

DiskX	Nicely done Sector-based disk editor. Binary only by: Steve Tibbett
MemBoardTest	Originally designed for production testing of A1000 memory boards. Very nice intuition interface. Version 2.4, Source in Modula by: George Vokalek
MSDOS	A program to list files written in standard MS-Dos orAtari ST format. The files can then be copied to Ram and rewritten to disk in Amiga-Dos format. Binary only, Shareware, V. 0.1.Author: Frank Wjbbeling
PCBTool	Early version of a shareware PC Board layout program Lots of options including variable size pads and traces, grids, grid snap, layers, zoom, selectable centering, text and more. This version does not support printer/ plotter dumps or libraries. V.2.6, B only .by: George Vokalek
ScreenX	A handy little background utility that provides a small clock/memory counter in its inactive mode and a versatile screen manipulator when called upon. Binary, source available from author, V2.1.by: Steve Tibbett
TaskX	A "real-time" task editor. Lets you list and set priorities of all currently running tasks. Binary , V. 2.0. by: S. Tibbett
VirusX	Update to FF154, checks for a couple of additional new strains. Includes source V. 1.6.by: Steve Tibbett
YachtC3	Update to FF10, contains some fixes and incorporates a simple sound process. V3, includes source. Author: Sheldon Leemon, with enhancements by MarkSchretlen

Fred Fish Disk 159

Free	A little command to put in your c directory that returns memory status and number of tasks currently served by EXEC Includes source. by: Joerg Anslik
MidiTools	A group of several different utility programs for those who run a Midi system. Binary only. by: Jack Deckard
StarChart	Nicely done intuition based program to display and identify about 600 stars, galaxies and nebulae visible in the Northern hemisphere. V.1.2, Source. by: Ray R. Larson
TaskControl	Nicely done task-handling program allowing you to put to sleep, kill or change priorities of the all the currently loaded tasks.Also potentially GURU-producing, so be careful what tasks you kill, change priorities of, etc. Handy windowizer will reduce it almostto an icon Binary only.by: J. Martin Hippele
TUC	"The Ultimate Clock". Another window title clock/memory minder. This one is in 132 columns! Also gives the free memory on drives DF0, DF1 & DF2.Includes source. by:Joerg Anslik

Fred Fish Disk 160

Calls	A little utility to help analyze the flow of a C-program by laying out the functions called in a hierarchical manner.Originally from Usenet with major revisions by Kevin Braunsdorf, Amiga portby George MacDonald
Check	A useful little utility for finding structural errors in C-source code. Many command-line options. V.1.03, binary only.by: Keith Elbertson
Dis	A 68000 disassembler, written in assembly, this is an update to the version on disk #128. Includes source by: Greg Lee with enhancements by Willi Kusche
DMouse	A versatile screen & mouse blanker, auto window activator, mouse accelerator, popcli, pop window to front, push window to back, etc, widget. V. 1.09, includes source Update to FF 145 by: Matt Dillon
DWIP	"Daisy Wheel IFF Printer". A graphics printing utility that allows the printing of IFF pictures on a daisy wheel printer. Includes source. by: Ken Van Camp
M4	A UNIX M4 look-alike macro processor intended as a front end Ratfor, Pascal, and other languages that do not have a built-in macro processing capability. Pd M4 reads standard input, the processed text is written on the standard output. by: Ozan S. Yigit (oz)
MemoPad	A shareware intuition-based memo reminder program.Nicely done. Update to version on disk #146, v .2, binary only.by: Michael Griebling
NeuralNets	A neural network example using the general-ized back-propagation delta rule for learning, specifically applied to the tabularasa Little Red Riding Hood instance. by: J. C. Hoskins

Fred Fish Disk 161

Friends	Sscreen hack with command-line options to keep your mouse pointer company when you step away. Source by: Michael Warner
Getsprite	Simple little program to convert Dpaint brushes into C-sourceBinary only. by: Michael Warner
IncRev	A handy little program that will automatically increment the revision number of a program every time it is recompiled.Binary only. by: Bryan Ford
LGZ	A Map generator/editor for the LGZ game. Not useful if you don't happen to play that game, but good source example of intuition interfacing. V.0.1 by: Lars & Henrik Clausen
Mackie	A versatile cli/macro-key initiator based on POPCLI with a unique method of "screen-blanking". I won't say more, just try it!V.1.1, with source. by: Thomas Rokicki
Nag	A shareware appointment calendar with it's own editor and a unique 'nagging' feature utilizing the Amiga's voice and audio devices. V.1.6, binary only. by: Richard Lee Stockton
Perl	Practical Extraction and Report Language, an interpreted language optimized for scanning arbitrary text files, extracting information from those text files, & printing reports based on the information.by: Larry Wall
VRTest	Another anti-virus utility that allows visual inspection of ram starting a $7E7FE, ram cleaning, bootblock inspection and vector monitoring/ reseting. Written in assembly V. 3.2, binary only.by: Babar Khan
XBoot	Very simple utility to convert a boot block into an executable file to use your favorite debugger (Wack, Dis, etc.) to study it. withsource.by: Francois Rouaix

Fred Fish Disk 162

Avi	A workalike version of the UNIX vi editor for the amiga.Thoug not especially recommended for beginners, designed for those of you who may have the vi commands permanently hard-coded into your fingertips! V.1.0, binary only. by: Peter Nestor
CLI_Utilities	This directory contains several subdirectories with small utilities, collected from various sources, only usable from the CLI. Some with source. Author: Various
Dark	A small graphics and animation demo.withsource. by: Phil Robertson
Flow2Troff	A little utility to convert from New Horizons Software "FLOW" files to UNIX "troff" files, suitable for printing on any troff-compatible laser printer. V. 1.0, includes source and a sample "FLOW" file. by: Daniel Barrett
LabyrinthII	A shareware role-playing text adventure game similar in operation to the Infocom text adventures.Includes source. by: Russell Wallace
Iffar	Maintains archives of Interchange File Format (IFF) FORM CAT and LIST files in a manner that complies with the IFF CAT specification. V.1.2, includes source by: Karl Lehenbauer
SetPALorNTSC	A couple of utility programs for testing the suitability of a developed program in either the PAL or NTSC environments. Includes source and a sample program.by: Peter Kittel
TES	"The Electronic Slave" adds a gadget strip to the top of he cli window to perform such functions as device directories info, run ED, and time. Currently, assignments are hardcoded but not difficult to change if you own a compiler. V. 1.1, with source.by: Joerg Anslik
UnknownGirl	Amall musical piece similar in execution to Synthemania" on FF153. Binary only. byHolger Lubitz

Fred Fish Disk 163.

Bankn	A complete shareware checkbook system. Update to FF120. V1.5, binary . by: Hal Carter
FiveInLine	Board-playing game simillar to Go-Moku, Ristinolla, etc. Fast-paced & addictive! Source. by: Njel Fisketjxn
MachII	A "mouse accelerator" program which includes hotkeys, the features of sun mouse, clicktofront, popcli, title bar clock with a bbs online charge accumulator, and more. Update to FF130. V2.4c, binary only. by: Brian Moats
MemTrace	Routines help debug memory allocation and freeing during program development. Complains if you try to free memory you didn't allocate & reports on memory not freed when your prog finishes. by: Jojo Wesener
PcPatch	Patches for PCCopy and PCFormat from the 'EXTRAS 1.2' disk, to allow reading/writing/formatting 3.5 inch 360k (2 sides/ 40 Tracks/9 sectors) MS-DOS disks. by: Werner Guenther
ReadmeMaster	A nifty little database for finding those programs that you know exist somewhere (???) in the AmigaLibDisk library. Maintains a key-word dictionary of the Contents descriptions that allows searching by disk number, program title, author's name, or some other descriptive word. Currently supports disks 1-154 with planned updates. Binary by: Harold Morash
View	A mouse-oriented text file reader. Sample operation is demonstrated in reading the View.doc file, instead of using the usual "Less" text file reader. by: Bryan Ford

Fred Fish Disk 164.

C-Functions	A group of four little C-functions to add to your library to make your programming life a little easier. Includes source and a small demo program showing some of the results. by: Lars Thuring
DiskSalv	Very useful program to recover files from a trashed AmigaDOS disk. Can also "undelete" files deleted by mistake, so long as they have not overwritten by further disk activity. Requires two disk drives. Many enhancements since the original version on disk #20. Version 1.3, Binary only by: Dave Haynie
Hed	A handy little editor that is more user-friendly than "Ed", yet doesn't require the memorization of complicated keystrokes of some of the larger, more powerful, editors. Binary only. by: Hal Carter
Newton	Uses the "Newtons Method" algorithm to estimate both real and imaginary roots of a polynomial of degree 20 or less. Version 1.0, includes source. by: Daniel Barrett
NewZAP	A third-generation multi-purpose file sector editing utility, from the author of FileZAP. Displays and edits full 512-byte sectors via a 106 character wide internal font. Includes a search feature to find specific strings or hex digits, forwards or backwards. Update to FF#58. Version 3.18, Binary only. by: John Hodgson
PcView	Provides the PC community with the opportunity to display IFF pictures to the best of EGA's ability. Displays Amiga pics, IBM-PC Deluxe Paint Pics, Apple II-GS Deluxe Paint Pics, and others in the IFF standard format. Includes source. Author: John Hodgson
PolyRoot	Another Polynomial root-finder using the Newtonian algorithm. Nicely done in AmigaBasic with good documentation file. Version 2.00. Author: Jon Giorgini
PrtDrivers	A couple of new Printer Drivers. Digital Equipment's LN03+ laser printer, Mannesmann Tally's MT420d dot matrix. Authors: DEC LN03 — Bernie Mentink MT420d — Sascha Wildner
Zoo	A file archiver, much like "arc" in concept, but different in implementation and user interface details. Includes some nice features that "arc" lacks (such as file/path names up to 255 characters in length). This is version 2.00, an update to FF 136. Binary only. by: Rahul Dhesi, Amiga port by Brian Waters

Fred Fish Disk 165.

Conman	Extremely useful replacement for the standard console handler, provides line editing and command line histories. Completely transparent to any application program that uses CON: windows. Shareware, and well worth a donation to the author. V1.3, binary only, update to FF133. by: William Hawes
CPM	Another CP/M emulator independently authored from the version that appeared on disk #157. Emulates a CPM computer with a Z80 processor connected to an ADM3A terminal. Assembly source included. by: Ulf Nordquist
Parsnag	A program to aid in performing color separations on Epson JX-80 printers. Source. by: John Hodgson
PlotView	A couple of programs, Plotview and Plot2Am, for viewing UNIX plot files. Also included are two sub-directories: Plot — a device independent plotting package for the Amiga, compatible with the UNIX plot subroutine package and Plot2Tek — converts UNIX plot format files to Tektronix 410x terminal graphic commands. Source included. Author: Joel Swank
RamCopy	A copy program designed for machines with 1 meg or more of Ram and only one disk drive. Copy a complete disk in only one pass. by: Stephen Gunn
SPUDclock	A simple program that uses the narrator device to speak the time at certain user specified intervals. Lots of command line options. Version 1.2, includes source. Authors: Robert E. Beaty and H. Bret Young

Fred Fish Disk 166.

AutoGraf	Collects and graphically displays information on auto mileage. Features such as miles per gallon, cost per mile, miles driven, highs, lows, averages, etc. Includes sample data file, a couple utility programs and source. Version 1.0 Author: Joel Swank
Cref	C cross referencer program. Prints out your code with line-numbers and complete key-word cross-referencing. Update fto ff#103 which had a serious bug. Includes source. by: Mike Edmonds; Amiga port by Joel Swank
MultiCalc	Yet another RPN type graphic calculator. This one generates answers with extreme precision (if 3000 digits is enough!) Features a 48-digit scrollable display, mouse driven with lots of keyboard shortcuts, & iconification during non-use. Binary . by Ken Johnson
Stevie	A public domain clone of the UNIX 'vi' editor. Supports window-sizing, arrow keys, and the help key. Version 3.10a, includes source. Amiga port by Tony Andrews

Fred Fish Disk 167.

CDecl	English to C (and vice versa) translator for C declarations. This little gem will translate english such as "declare foo as pointer to function returning pointer to array 10 of pointer to long" into "long *(*(*foo)())[10]", and vice versa. Update to FF114. Includes source. by: Graham Ross with enhancements by David Wolverton, Tony Hansen, Merlyn LeRoy, Udi Finkelstein & more.
CLIcon	Run CLI programs from workbench, similar in operation to IconExec, but more versatile. by: Bryan Ford
CloseMe	Another ingenious perversion in the screen hack category. Don't miss this one...surely destined to become a classic! Includes source. by: Charlie Gibbs
DSM	(Dynamic Sound Machine) Demo version with "Save" disabled of a program which will take any IFF sound or raw data and save it as a totally self-contained, runable program. by: Foster Hall
MRPrint	A cli-based text file printing utility with lots of nice features, including tab-to-space expansion, page headers, line numbers, margin control with line-splitting and pagination correction, ARP wildcard support, and auto- rejection of files containing binary characters. Version 3.1, Includes source. Author: Mark Rinfret
Smus3.6a	An enhanced version of the smus player that last appeared on FF58 Author: John Hodgson
Sounddemos	Some very nice demos for showing off the incredible audio power of the Amiga!. 100% assembly language, Connect the stereo for these! Author: Foster Hall

Fred Fish Disk 168.*

Fred Fish Disk 169.*

* Fred Fish 168 and Fred Fish 169 contain and programs submitted by Matt Dillionmust be purchased at the same time to utilize the programs on the disk. In order to maintain the congruity of Matt Dillion's files, Fred kept the disks in their original form. We apologize for this inconvienence, but we feel the library should remain intact under Fred's original guide lines.

CONFIG V1.00	Configure friendly programs like DME for the initial window placement (configs the executable) by MDillion
Clock V1.00	Simple clock, configurable with config by MDillion.
DME V1.31	My programming oriented editor by MDillion
DMouse V1.10	Mouse enhancer .. acceleration, blanking, etc...(now handles requesters better w/ auto-activate) by M Dillion
Backup V2.01	HD backup/restore by M Dillion
SUPLIB	Support (link time) library required to compile Matt Dillion's programs. by M Dillion
LIBREF	Utility for generating run-time library link library assembly files, lvo.asm, & the run-time library's vector list. Currently very Aztec in what it generates. by MDillion
DRES V1	Support (run time) library w/ lots of functions including a generic parser and IPC. by Matt Dillion
DASM V2.11	Small-systems assembler. Handles 6502 and some of the Motorola single chip microcomputers. Generates code (not object module oriented). by Matt Dillion
FTOHEX	Part of DASM used to convert a DASM executable into an intel-hex formatted ascii file. by Matt Dillion
FILES V1.2	Matt Dillion's disk catalog program. by MDillion
SHELL V2.10	Added enviroment variable support and more. Use ConMan if you want command line editing by MDillion
FINDIT V1.00	Search for a filename (wildcard) by MDillion
LIBS V1.00	list libraries/devices in ram or attempt to remove libraries. by MDillion
SCAT V1.00	Utility to 'cat' binaries without blowing up the display by MDillion
ADDCR V1.00	Utility to add CR's before LF's in files by MDillion
REMCR V1.00	Utility to remove CR's in files by MDillion
CMP V1.00	Utility to compare two files by MDillion

Fred Fish Disk 170.

Altterm	Commmunications program utilizing IBM 3278 terminal emulation. Binary only. by: Don Brereton
Dis6502	A ported 6502 disassembler with support added for C64 binary files. Includes source. by: Robert Bond, Amiga port by Udi Finkelstein
FastText	Blitter based fast text rendering routines written in assembly. Unique in the fact that they speed up rendering of non-proportional fonts of any height, and from 4-16 pixels in width. Source and test program included. by: Darren M. Greenwald
MRBackUp	A hard disk backup utility that does a file by file copy to standard AmigaDOS floppy disks. Includes an intuition interface and file compression. Version 2.4, Update to FF129. Binary only by: Mark Rinfret
PtrAnim	Nifty pointer animation program, includes lots of samples, a utility program and instructions on creating your own animations. Binary only, shareware by: Tim Kemp
Surf	Generates bezier surfaces of revolution. Will produce some amazing pictures of wineglasses, doorknobs, or other objects one could turn on a lathe. Includes the capacity to map IFF image files onto any surface that it can draw. Source included by: Eric Davies
Turbo	Opens a small window with a gadget that when selected, turns off bitplane, sprite, copper and audio DMA, to increase system speed. Source. by: Oliver Wagner

Fred Fish Disk 171.

AZComm	Modified version of Comm 1.34 that contains Zmodem send, receive, and resume receive. Version 1.00, Binary only. by: SS. Patel, based on Comm 1.34 by DJ James
Maze	A couple of very nice demos for the creation and use of single-solution mazes, one of which is practically a stand-alone game. Includes source. by: Werner Gunther
Sozobon-C	Atari ST version of what appears to be a full K&R freeware C-compiler, assembler and linker. The compiler main pass and the assembler were compiled and tested on an Amiga A2000 with only minimal changes, and they appear to work (to the extent that they believe they are running on an Atari-ST), so an Amiga port should be relatively easy. by: Sozobon, Limited.
Xoper	Very comprehensive program to monitor and control system activity. Monitor cpu, memory usage, ports, interrupts, devices. Close windows, screens, show loaded fonts or last Guru code number. Clean up memory, flush unused libraries, devices, fonts. etc. and a whole bunch more! Spawns its own process. A very handy background task to have loaded. Assembly source included. by: Werner Gunther

Fred Fish Disk 172.

DataToObj	A utility to convert raw data files (sprites, image data, text, etc.) directly into object code which can then be linked to the main program without the need to go through the compiling process. Includes source. by: Werner Gunther
Handshake	A full featured VT52/VT100/VT102/VT220 terminal emulator. he author has taken great pains to support the full VT102 spec. Now supports ANSI colors, screen capture and more. Update to version on FF60. Version 2.12a, binary only, shareware. by: Eric Haberfellner
MFix	Small program to insert in the startup-sequence of the commercial program, Marauder II, from Discovery Software, International. When the copy process starts, the rainbow screen is covered by a bare screen until the copy is finished. Author claims a 25% decrease in copy time is achieved. V1.0, Binary. by: Stephen Gunn
PopInfo	A "shrinkable" workbench utility to show you some info Workbench doesn't, such as free memory on external devices, chip, fast, and total ram usage and more. V2.0, Includes source. by: Jonathan Potter
ProCalc	Simulates an HP-11C programmable calculator. Lots of enhancements and bug fixes since the original version on FF139. V1.2, binary only, shareware by: Gotz Muller
Spiff	Make controlled approximations between two files. Similar to "diff" but more versatile. Allows for the handling of numerals as string literals or numeric values with adjustable tolerances. Provides for embedded commands, scriptfiles, and many other command-line parameters. Potentially very useful, needs some Amiga-specific work. Source and example files included by: Dan Nachbar, Bell Communications Research (BELLCORE)

Fred Fish Disk 173

CrcLists	Complete CRC check files for disks 146-172 using the crc program from disk 133. These were made directly from FF masters Author: Fred Fish
FileSelect	A FileIO selector, written 100% in assembly. V1.0, includes source Author: Fabrice Lienhardt
IffLib	Ready-to-use library to perform various manipulations on IFF files. Includes a sample IFF viewer and a utility to save the front screen as an IFF file.Author: Christian A. Weber
ILBM2C	Very useful utility for C-programmers. Reads in a standard IFF ILBM file and outputs a file that can be included in your program. Includes source and a sample program. Author: Tim Kemp
Tetrix	An addictive game of speed, skill and luck. Based on a game originally called Tetris. The object is to fit together oddly grouped falling blocks to create a solid wall, which is then cleared from the bottom up. Sounds simple enough right? Sure...! Shareware, Version 1.1, Binary only. Author: David Corbin
Uedit	Version 2.4g of this nice shareware editor. Has learn mode, a command language, menu customization, and other user configurability and customizability features. Binary only, shareware, update to FF121. Author: Rick Stiles

Fred Fish Disk 174

Castle	A simple graphics adventure game suitable for beginners. Binary only. Source available with a small donation to the author. Author: H. James Fox
Iff2Sun	A small utility for those of you who may have access to a Sun workstation. Takes an Amiga IFF file and converts it to a Sun rasterfile format. Source only, as the program needs to be re-compiled and run from a Sun. Authors: Steve Berry, Mark Thompson

Print1.2	CLI-based printing utility with several nice features including the ability to print in ASCII or HEX, with or without line numbers and a CTRL-C Trap. Includes source. Author: John F. Zacharias
Sh	Another version of the 'Sh' utility to unshar shell archives. Apparently corrects some problems encountered by similar programs. Until we can get everybody using some sort of "standard", perhaps if we collect enough of these utilities, we will eventually find one that works with the particular archive we're trying to unshar! Includes source. Author: Jim Guilford
Strings	A simple utility with command-line options for locating strings in a binary file. V1.0, includes source. Author: Joel Swank
TitlePage	Prints banner-type title pages for identifying listings. Lots of command-line options for specifying various fonts, pitches, typestyles, selectable centering, etc. Includes source. Author: Joel Swank
Tunnel	An interesting graphics demo written in TDI-Modula 2. I suggest you don't stare at this too long! Includes source. Author: Garth Thornton

Fred Fish Disk 175

Elements	Very nice interactive display of the the Periodic Table of Elements. Can display a large amount of pertinent data about a selected element along with a good deal of general and miscellaneous info. Author: Paul Thomas Miller
Furnish	For those of you who may have ever used the "scale size cut and place" method of determining your next living-room arrangement, this Amiga-ized version may be just what you need. Binary only, shareware. Author: Terry Gintz
Plot	Program to compute and plot 3 dimensional functions. Major revision to PD version on FF49 . V4.1, binary only, shareware. By: Terry Gintz
SafeBoot	Very handy intuition-based program to read and save custom bootblocks. The bootblock can then be later restored should the disk become virus-infected. V2.2, binary only. Author: Mark Lanoux
SendMorse	Brush up on your morse code with this simple program that will read an input textfile and output the characters at an adjustable rate. By: Joe Larson
VirusX	V 3.10 of the popular virus detection/vaccination program. Features a test for the new IRQ virus, among others, and a new "Kill Virus" utility. Includes source. Author: Steve Tibbett
WBDepth	CLI program that allows you to change the number of bitplanes for the WB screen on the fly. Very useful for A500 and A2000 users with kickstart in ROM. Binary only. By: Andry Rachmat
Zippy	A "Graphical Shell". Opens a medium-size window and attaches a menu-strip for performing all sort of disk/data manipulations. Features script files allowing you to attach custom menu selections as you move between directories. Also included is an intuition based utility for altering FileInfo data. (filename, filenote, RWED attributes, etc.) V 2.5, binary only. By: MWeiblen

Fred Fish Disk 176

AnalytiCalc	V23-2A of Glenn Everhart's large and powerful spreadsheet program called AnalytiCalc, submitted to me directly by Glenn for inclusion in the library an update to FF144. AnalytiCalc is presented in entirely ZOOed form because it could not otherwise fit on a single disk. With this release, AnalytiCalc has become "Freeware" rather than "Shareware". Thus the only restrictions on AnalytiCalc code are that derivative programs remain freely distributable.
HyperNet	HyperNet is a small hypertext shell program for Amiga, presented with sources and brief documents. . HyperNet allows a "master" AmigaDos process to control a series of connected processes, where the connections are randomly ordered directed graphs. Permissible "child" processes available at any stage are governed by the links of the graph. The implementation is mainly instructive, but can be used for tutorials or demonstrations and illustrates the simplicity of hypertext concepts on a multi-tasking system. Author Glenn Everhart

Fred Fish Disk 177

ASpice	A version of the SPICE 2G.6 circuit analysis program which has been modified to run in the Amiga environment. The program arrays are adjusted to require one forth the memory of the DEC VAX version. Although this does not usually put much of a constraint on circuit analysis, some users who are used to the full mainframe environment may have to be more aware of the memory demands of their analysis. Requires a minimum of 1.5 MB memory. This version neither supports nor requires the 68020 processor or 68881 coprocessor. Binary only. By Many
DiskSalv	V1.32 of the popular "undelete" and file recovery program. Fixes a few bugs apparently found on the V1.3 on FF164. Author: Dave Haynie
Jask	An intuition-based replacement for the ASK command. Will bring up a requester with a message and boolean yes/no type gadgets. V 1.0, includes source. Author: John Barshinger
Marge	A simple CLI utility to add a specified number of spaces or tabs to the left side of every line in a file. Includes source. Author: Joel Swank
Path	An interesting concept in path-searching. This program contains a path-handler that allows you to selectively control or assign your system's search path using script files. Includes source. By: Rico Mariani

Fred Fish Disk 178

AmicForm	Creates a phonebook containing only those areacodes and exchanges reachable through PC-Pursuit. Update to FF157. Works with the new Finalist BBS format. V1.4, Binary only. By: John Motsinger
BlackBox	The black box is an 8x8 grid in which several "atoms" are hidden. Your job is to find the atoms. You have at your disposal a ray projector which you can use to send rays into the box from any of the 32 spots around the box. Binary only. Author: Tim Kemp
CIATimer	Two versions of ciatimer routines to provide precise timing for applications requiring a high-accuracy real-time clock. Includes source and a sample executable. Author: Karl Lehenbauer, based on the original version by Paul Higginbottom
Cosmic	An interstellar multiplayer game of War and Peace. From the looks of the documentation file, it appears fairly extensive! V1.01, includes source. By: Carl Edman
Ls	V2.0 of the popular UNIX style directory lister. Revised for Lattice 5.0 and made 1.3 compatible. Includes source. Author: Justin V. McCormick.
RemLib	Removes a specified library (if currently unused) or displays some information about all available libraries. Update to FF139. V1.11, includes source in assembler. Author: Heiko Rath
RexxArpLib	V2.0 of the rexxarplib.library, which has grown considerably, with substantial intuition interface support. Also included is a large number of ARexx macros. Author: W.G.J. Langeveld

Fred Fish Disk 179

DietAid	Diet planning aid to allow the user to compile lists of ingredients (recipes) and automatically compute calorie totals, etc. Update FF36. V3.1, binary only. by Terry Gintz
Dmake	Beta release of Matt's version of the UNIX make utility. Features multiple dependancies, wildcard support, and more. Includes source. By Matt Dillon
Excption	Exception is a set of error handling routines that provide a programmer with the ability to easily handle often difficult to implement routines. Routines such as no more memory, file not open, read/write error....etc. V0.6, includes source. By Gerald T Hewes
KickFont	For A-1000 owners, will permanently replace the topaz font on the kickstart disk with a font called "look". Includes a sample in the form of an IFF picture. V3.0, binary only. Also included is Benjamin Fuller's freely redistributable 'SumKick' program. By Greg Browne
Launch	Sample program showing how you can load and execute a program in the workbench environment, then return to the CLI. Includes source. By Peter da Silva
Regexp	A nearly-public-domain reimplementation of the V8 regexp(3) package. Gives C programs the ability to use egrep-style regular expressions, and does it in a much cleaner fashion than the analogous routines in SysV. Includes source. By Henry Spencer
TSnip	Very nice "cut and paste" type utility with lots of uses and functions. Features a pop-up intuition control panel, multiple font and color recognition, clipboard and pipe support and a couple of utility programs. V1.4a, source for support programs only. By John Russell
UnixUtil	A few CLI utilities, including some functionally similiar to the UNIX utilities of the same names. Included are: Wc, Head, Tail, Tee, Detab, Entab, and Trunc. Descriptions are given in the included '.doc' files. By Gary Brant

Fred Fish Disk180

Browser	A programmer's "Workbench". Allows you to easily and conveniently move, copy, rename, and delete files & directories from a CLI environment. Also provides a method to execute either Workbench or CLI programs. V1.6, update to FF134, binary only. By Peter da Silva
GeoTime	A couple of interesting "clock" type programs based on the "Geochron". Observe the earth's shadow scroll across a map or globe in real-time, based on the system clock. V1.0, binary only, shareware. By Mike Smithwick
GPrint	A black & white graphics print utility for Epson compatible printers. Command-line options allow several different print qualities and densities. Includes a couple of sample IFF files for printing. V2.03, binary only, shareware. By Peter Cherna
Jed	A nicely done, intuition-based editor that is quite user-friendly. Features word-wrap, auto-indent, newcli, alt buffer, split-window, keyboard macro, help, printing, and more. V1.0, binary only, shareware. By Dan Burris
NoVirus	Another Anti-Virus utility. This one features known and new virus detection, view boot block, save and restore bootblocks, several "Install" options and more. Written in assembly. V1.56, binary only. By Nic Wilson
RepString	Nice little CLI utility to replace any type of string in any type of file with another string of any type. V1.0, binary only, shareware. By Luciano Bertato
TrekTrivia	Very nice mouse-driven trivia type program for Star Trek fans. Contains 100 questions with additional trivia disks available from the author. Binary only, shareware. By George Broussard

Fred Fish Disk 181

AMXLISP	Amiga-ized version of the XLisp interpreter originally by David Betz. V2.00, includes source. By David Betz; Amiga work by Francois Rouaix
Bally	Amiga port of the former arcade game named Click. Lacks sound effects,promised for later updates. V0.1, binary only, shareware. By Oliver Wagner
Tracker	Useful debugging routines similar in function but more versatile to those of "MemTrace" on FF163. Will track and report on calls to AllocMem(), FreeMem() [or lack thereof!] among others. V0.0a (Alpha release). By Karl Lehenbauer

Fred Fish Disk 182

AMC	"Amiga Message Center". Scrolls a message from a text file across the screen on a colorful background. Similar to the "greetings" programs developed by European Amiga enthusiasts. V1.0, binary only. By Foster Hall
Edimap	A keymap editor. Allows you to read in an existing keymap file, modify it to suit your needs, and save it as a ready-to-use keymap. V1.0, includes source. Author: Gilles Gamesh
HR136	An IFF file containing a chart showing every possible mixture of the sixteen basic palette colors. Also included are optimized and monochrome palettes along with several tips and techniques for using them with various paint programs.By Dick Bourne
Iconmerger	Intuition-based program to take any two brush files and merge them into an alternate-image type icon. V2.0, binary only. By Terry Gintz
Sam	Another IFF sound player with several command-line options. Includes several samples. V1.0, binary only. By Nic Wilson
SetFont	Allows you to change the system font with various command-line options. Cleans up all known bugs in FF75. V2.5, includes source in C++. By Dave Haynie

Fred Fish Disk 183

FixFd	A utility for Amiga assembly programmers. FixFd will read a '.FD' file and output a file that can be 'INCLUDE'ed rather than having to link with the colossal 'Amiga.Lib'. V1.0, includes source in assembly. By Peter Wyspianski
Mklib	Another example of building a shared library that evolved from "Elib" FF87. Also included is a library, Edlib, which contains several functions not included in the Manx standard libraries. Includes source. By Edwin Hoogerbeets with C-functions from several different authors
PCQ	A subset implementation of a freely-redistributable Pascal compiler. Supports include files, external references, records, enumerated types, pointers, arrays, strings and more. Presently does not support range types, the 'with' statement or sets. V1.0, includes source and sample programs. By Patrick Quaid

Fred Fish Disk 184

BI	A small brush to to C-code image converter, intended to be used from CLI. V1.0, binary only. By Terry Gintz
CardMaker	A programmer's aid for creating card image data that can be used in any card game that uses the standard 52 card deck. V1.0, binary only. By Terry Gintz
DPS	Demo version of a program that will allow you to take any IFF file and save it as a totally self-contained executable file, without the need for any IFF-viewers. V1.0, binary only. By Foster Hall
MouseUtil	Intuition based program to allow you to change your mouse speed without having to go through preferences. V1.1, includes assembly source. By Luciano Bertato
Print	Small print utility designed to replace the "copy <filename> to prt:" command. Opens a window displaying the filename being printed, length, and a status bar showing percent completed. Also includes an abort gadget. V1.0, binary only. By Luciano Bertato
VacBench	This amusing little screen hack will "clean up" your WorkBench screen for you when it gets too cluttered! Binary only. By Randy Jouett
World	A text adventure game similar to the Infocom adventures of Planetfall and Starcross. Quite large with a tremendous variety of responses. V1.02, includes source. By Doug Mcdonald, Amiga port by Eric Kennedy

Fred Fish Disk 185

Commodore IFF	This is a copy of the official November 1988 Commodore IFF disk. All the files in the "documents" directory are in zoo file "documents.zoo"

Fred Fish Disk 186

A68k	A 68000 assembler originally written in Modula-2 in 1985 and converted to C by Charlie Gibb in 1987. Has been converted to accept metacomco-compatible assembler source code and to generate Amiga objects. Includes source. This is V2.42, an update to FF110. By Brian Anderson; C translation and Amiga work by Charlie Gibb
Cards'O'Rama	A simple game that let's you push your memory. It is played with a deck of 32 cards, grouped in 16 pairs. The cards are shuffled and then displayed at the beginning of each game. Your goal is to pick up as many pairs as you can, until there are no cards left on the screen. V1.0, includes source. By Werther Pirani
Qt2	A cute program that gives the time the way many people actually do, I.E. "it's nearly ten to five". Includes source in assembly. By Charlie Gibb
SimCPM	A CP/M simulator for the Amiga. Simulates an 8080 along with H19 terminal emulation. Includes source. This is V2.3, an update to FF109. By Jim Cathey; Amiga port by Charlie Gibbs and Willi Kusche

Fred Fish Disk 187

Diskperf	A disk benchmark program which runs on both Unix and the Amiga. This is an update to FF48, with bug fixes and more reliable measurements of the faster read and write speeds available under the new Fast File System. By Rick Spanbauer, enhancements by Joanne Dow
HackLite	This is the latest version the Amiga port of Hack, with lots of Amiga specific enhancements and neat graphics. Now includes an easy to use installation program. This is HackLite V1.0.0, binary only. By Software Distillery
Mackie	A versatile cli/macro-key initiator based on POPCLI with a unique method of "screen-blanking". I won't say more, just try it! V 1.13, includes source. This is an update to FF161. By Tomas Rokicki
SetCPU	A program designed to allow the user to detect and modify various parameters related to 32 bit CPUs. Includes commands to enable or disable the text/data caches, switch on or off the '030 burst cache line fill request, use the MMU to run a ROM image from 32-bit memory, and to report various parameters when called from a script. V1.4, includes source. By Dave Haynie

Fred Fish Disk 188

BootIntro	This program creates a small intro on the bootblock of any disk, which will appear after you insert the disk for booting. The headline can be up to 20 characters. The scrolling text portion can be up to 225 characters. V1.0, binary only. By Roger Fischlin
DiffDir	Diffdir compares the contents of two directories, reporting on differences such as files present in only one directory, different modification dates, file flags, sizes, comments, etc. V1.0, includes source. By Mark Rinfret
ExecDis	A disassembler comment generator program for the 1.2 Kickstart ROM exec library image. Generates a commented disassembly of the exec library. V1.0, binary only. By Markus Wandel
FastGro	A fractal program, simulating Diffusion-Limited Aggregation (DLA) as described in the December 1988 Scientific American in the Computer Recreations column. This program is about an order of magnitude faster than the "SLO GRO" program described in Scientific American. V 1.0, includes source. By Doug Houck
FracGen	A fractal generator program that generates fractal pictures from "seeds" that you create. This is unlike any of the other "fractal generators" I've seen. It can be used to load and display previously created fractal pictures, modify existing fractals, or create your own fractals. V 1.23, binary only, update to FF142. By Doug Houck
MemoryClock	A clock program that shows the amount of free fast ram, free chip ram, as well as the time and date. Includes source in assembly code. By Roger Fischlin
MinRexx	A simple ARexx interface which can be easily patched into almost any program. Includes as an example the freedraw program from FF1. Includes source. By Tomas Rokicki
Null	A new dos device that behaves like "NIL:" but unlike "NIL:", it is a real handler. This makes it useful in lots of situations where "NIL:" cannot be used. V 0.0, includes source. By Gunnar Nordmark
TextDisplay	A text display program, like "more" or "less", but about half the size and handles all screen formats (pal/ntsc, interlace/non-interlace, etc). V 1.1, binary only. By Roger Fischlin

Fred Fish Disk 189

Mackie	A versatile cli/macro-key initiator based on POPCLI wit a unique method of "screen-blanking". I won't say more, just try it! Version 1.20, includes source. update of FF187. Author: Tomas Rokicki
NetHack	This is part 1 of a two part distribution of NetHack, which was too large to fit on a single disk, even when zoo'd. Part 2 is on disk 190. Both parts, along with zoo to unpack them, are required to use or rebuild NetHack. V 2.3. Includes source. Author: Various; Amiga work by Olaf Seibert
Uedit	V 2.4g shareware editor. Has learn mode, a command language, menu customization, and other user configurability and customizability features. Binary only, shareware, Update to FF 173 Author: Rick Stiles

Fred Fish Disk 190

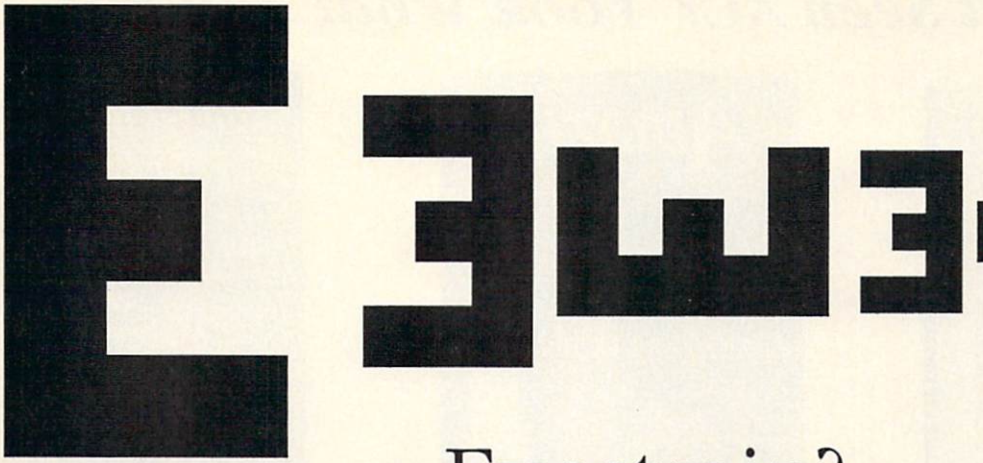
GaryIcons	A collection of more interesting and useful icons. Author: Gary Roseman
LBM2Image	Takes an IFF picture and generates a C source module which can be compiled and linked with your program to display the picture with the intuition DrawImage function. Binary only. by: Denis Green
NetHack	This is part 2 of a two part distribution of NetHack, which was too large to fit on a single disk, even when zoo'd. Part 1 is on disk 189. Both parts, along with zoo to unpack them, are required to use or rebuild NetHack. V 2.3 Includes source. Author: Various; Amiga work by Olaf Seibert

Fred Fish Disk 191

BlitLab	Blitlab is a program which lets you experiment with the blitter, to your hearts content, in relative safety. It opens a workbench window with gadgets for all the registers of the blitter, and allows you to manipulate individual registers and perform blits on a magnified bitmap. V 1.4, an update to FF84. Includes source. Author: Tomas Rokicki
Blk	A requester making tool employing various recursive algorithms including a recursive parser. It takes input text files and converts them to C-source for including as requester declarations. Update to FF152, with many enhancements. Includes source. Author: Stuart Ferguson
FileBootBlock	This simple little program reads blocks 0 and 1 of a bootable disk and saves them as a program file that can be run (heaven forbid) or disassembled by programs like DIS or DSM. Includes source in assembly code. by: John Veldthuis
Spell	A port of a Unix version of a freely distributable screen oriented, interactive, spelling checker. Update to FF54, with enhancements by Tomas Rokicki. V2.0.02, includes source. Author: Pace Willisson; enhancements by Tomas Rokicki
Pz15	Computer version of those cheap plastic puzzles with 15 white tiles numbered 1 through 15 and an empty square in a 4 by 4 arrangement. This one is more challenging since you can't solve it by just prying out the pieces. Includes source. Author: Mike Hall

Fred Fish Disk 192

Eval	This package allows you to manipulate expressions. Currently its two main functions are evaluation and differentiation. It also does some basic simplifications (based on pattern matching) to make the result of a differentiation more presentable. Includes source. Author: David Gay
PacMan87	This is a nice little "pacman like" game with some new features like fire pits, stabbing knives, electric arcs and flame throwers, that must be avoided. Has three levels of difficulty, easy, medium, and hard. Sounds can be toggled on or off. Keeps a record of the top ten scores. Shareware, binary only. Author: Steve Jacobs and Jim Boyd
ReSourceDemo	A demo version of ReSource, an interactive disassembler for the Amiga. This is a complete version except that the "save" features have been disabled. V0.36, binary only. by: Glen McDiarmid



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Fred Fish Disk 193

KeyMapEd	Allows you to change the KeyMaps used with SetMap This is a full featured editor providing support for normal, string and dead keys. The keyboard represented is from an A2000/A500 but it is fully compatible with A1000 keyboards. V1.02, includes source Author: Tim Friest
Zc	This is a modified version of the Sozobon C compiler fromFF171. It has been modified to generate code compatible with the A68k assembler from FF186 and a new frontend control program makes it easy to use like the UNIX "cc" frontend. V1.01, includes source. by: Johann Ruegg; Amiga work by Joe Montgomery

Fred Fish Disk 194

Moria	A single player dungeon simulation. The object of the game is to defeat the Balrog, which lurks in the deepest levels of the dungeon. You begin at the town level above the dungeon, where you may acquire supplies, weapons, armor, and magical devices by bartering with various shop owners, before descending into the dungeon to do battle. Amiga enhancements include pull down menus, graphics mode, pickup mode, a continuous move mode, a real time mode, a message wait time mode, as well as other modifications to improve overall playability and to take advantage of the unique features of the Amiga. V3.0, binary only, requires at least 1Mb of memory. Author: Robert Alan Koeneke and others. Amiga version by Richard Henderson and others.

Fred Fish Disk 195

MicroEMACS	Version 3.10 of Daniel Lawrence's variant of Dave Conroy's microemacs. This is an update to the version released on disk 119. New features include multiple marks, more function key support, a better crypt algorithm, and end-of-word command, a command line switch for setting environment variables, new hooks for macros, a command to strip trailing whitespace, internationalzation features like foreign language message support, horizontal window scrolling, much faster search algorithm, Amiga intuition support, and more. Includes source and extensive online documentation. Author: Dave Conroy, MANY enhancements by Daniel Lawrence

Fred Fish Disk 196

HamPics	These are some of the most stunning digitized pictures yet for the Amiga. They were scanned at a resolution of 4096 by 2800 pixels, 36-bits per pixel, on an Eikonix 1435 slide scanner, cropped, gamma corrected, scaled, and converted to Amiga IFF HAM files. They are displayed with a special ILBM loader that handles overscan HAM images. Includes source for the display program. Author: Jonathan Hue

Fred Fish Disk 197

CTags	Create a tags file from the specified C, Pascal, Fortran, YACC, lex, or lisp sources. A tags file can be used by a cooperating editor to quickly locate specified objects in a program's source code. Berkeley V4.7, includes source. Author: Ken Arnold, Jim Kleckner, and Bill Joy Ported to Amiga by G. R. (Fred) Walter
Find	Find is a utility which searches for files that satisfy a given boolean expression of attributes, starting from a root pathname and searching recursively down through the hierarchy of the file system. Very much like the Unix find program. V1.2, includes source. Update to FF134 Author: Rodney Lewis
FixHunk	A program to modify executable files to allow them to run in external memory. It forces all DATA and BSS hunks in the file to be loaded into CHIP memory. CODE hunks will still load into FAST ram if available. New features include an interactive mode to select where each DATA or BSS hunk will load into memory, support for overlays, support for AC BASIC compiled programs, and support for new hunk types as used by "blink". V2.1, binary only. Update to FF36. Author: D.J. James
Nro	Another roff style text formatter. This is version 1.5, an update to the version released on disk 79. New features include generation of ANSI/ISO codes for bold, italics, and underline, more than one formatting command on a line, longer macro names, and many more formatting commands. Includes source. Author: Unknown, posted to usenet by Alan Vymetalik Many enhancements by Olaf Seibert
Stevie	A public domain clone of the UNIX 'vi' editor. Supports window-sizing, arrow keys, and the help key. V3.35a, includes source. Update to FF166. Author: Various, Amiga work by G. R. (Fred) Walter

Fred Fish Disk 198

Charon	Charon is Bradley's entry for the First Annual Badge Killer Demo Contest. The text of the demo was written by Lord Dunsany (long before the Amiga). Bradley created the illustrations and animation. The sound track is a traditional Scottish tune "The Arran Boat". by: Lord Dunsany (1915), Bradley Schenck (1988)

Fred Fish Disk 199

ASimplex	An implementation of the Simplex algorithm for solving linear programs. It uses the standardized MPSX-format for input data files. V1.2, includes source. Author: Stefan Forster
Csh	V3.02a of a csh like shell derived from Matt Dillon's shell, V2.07. Includes many new or improved commands, some bug fixes, etc. Includes source. Author: Matt Dillon, Steve Drew, Carlo Borreo, Cesare Dieni
MIDIsoft	A program to transfer sound samples between the Amiga and a Roland S-220. V1.0, binary only. Author: Dieter Bruns
Pyro	A screen blanking program that goes beyond the normal blanking process. When there are no input events, pyro takes over and starts a little fireworks display in color. V1.1, binary only. Author: Steve Jacobs and Jim Boyd
SnipDemo	Demo version 1.23 of signal processing program sold by Digital Dynamics. Binary only. Author: John Hodgson
Viewer	A very small program for displaying IFF pictures of any resolution. This one is written in assembly code and is only 988 bytes long. Binary only. Author: Mike McKittrick

Fred Fish Disk 200

NotBoingAgain	Dr. Gandalf's entry for the First Annual Badge Killer Demo Contest. It is an interlaced HAM animation with nicely integrated sound effects. It is a great visual pun on the original Boing demo, but to say anymore would ruin the effect. Binary only, requires 1 Mb of memory. Author: Dr. Gandalf (Eric J. Fleischer, MD)
Tank	This is Vincent's entry for the First Annual Badge Killer Demo Contest. It is an animation of a "fishtank simulator", with sound effects and a cute twist. Binary only. Author: Vincent H. Lee

To Be Continued......

In Conclusion

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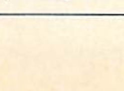

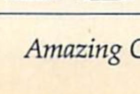

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February 1989 Volume 4.2

AMAZING FEATURES

MovieSetter: The Next Generation *by Steve Gillmor*
A new level in Amiga animation.

AmiForum *by Steve Pietrowicz*
The Amiga pays a mid-winter visit to Mickey's hometown for the first regional Amiga show.

Max Morehead Interview *by Richard Rae*
Rick talks to the creator of Moviesetter.

A Common User Interface for the Amiga *by Jim Bayless*
Does the Amiga need a kinder, gentler interface? Vote now!

AMAZING REVIEWS

Superbase Professional *by Marion Deland*
A user's look at Superbase Pro.

Microfiche Filer Plus *by Ronald Courrier*
A multi-tasking database that uses ARexx to work with other programs

Torch 2081 *by Jeffery Scott Hall*
Fast action, and smooth graphics

AMAZING PROGRAMMING

SPY *by Steve Faiwiszewski*
Programming intrigue in Modula -2

Sync Tips*by Oren Sands*
Getting inside the genlock.

On the Crafting of Programs *by D J. Hankins*
Do we need a common standard for C programming? Look ANSI.

C Notes from the C Group *by Steven Kemp*
An introduction to unions

The Command Line *by Rich Falconburg*
ED, your Workbench Screen Editor

An Introduction to ARexx programming *by Steve Faiwizewski*
Climbing the Towers of Hanoi.

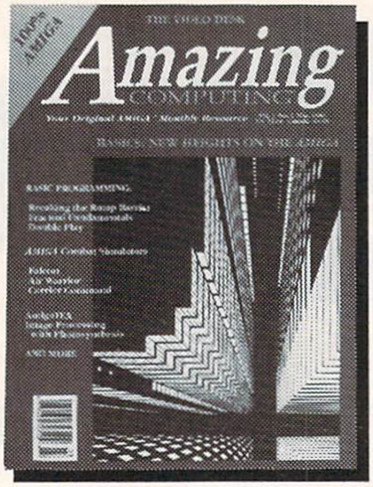
Crunchy Frog *by Jim Fiore*
Amiga-specific C programming.

AMAZING COLUMNS

Super Bug Bytes *by John Steiner*
A double dose of bug repellant.

New Products *by Michael Creeden*
What's New? Deluxe Print II, The Talking Animator, 3 digit fun, and more.

Roomers *by The Bandito*
Big resignation at Commodore, big budget cuts at a major, and the Bandito's fearless predictions.



March 1989 Volume 4.3

AMAZING FEATURES

Falcon *reviewed by Joe DiCara*
Latest from Spectrum Holobyte's hangar

Air Warrior *reviewed by Michael Mantino*
Hook up via modem and battle it out with international opponents!

Carrier Command *reviwed by Lawrence Lichtmann*
Admiral Lichtman signs up for carrier duty

World of Commodore Toronto *by Ed Berkovitz*
Ed files his report from Toronto

Fractal Fundamentals *by Paul Castonguay*
Experiment on the edge of a new science by creating your own fractals

AMAZING REVIEWS

Image Processing with Photosynthesis *by Gerald Hull*
An experiment with a repertoire of AI image-processing techniques

Gizmoz 2.0 *by Steve Carter*
Steve Carter reviews version 2.0 of Digital Creations' box o' fun

AmigaTEX *by Barney Schwartz*
A page description language from Radical EyE software

flickerFixer *by Steve Bender*
Steve gives us a clear perspective on MicroWay's flickerFixer

AMAZING PROGRAMMING

Benchmark 1: Fully utilizing the MC68881 *by Read Predmore*
Part I: Turbocharging the savage benchmark

Breaking the Bmap Barrier *by Robert D'Asto*
Streamline your AmigaBASIC library access with Quick_Lib

Double Play *by Robert D'Asto*
AmigaBASIC program yeilds double vision.

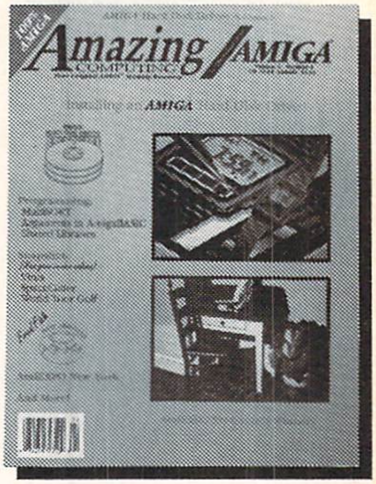
C Notes From the C Group *by Stephen Kemp*
A walk through preprocesor control lines

AMAZING COLUMNS

New Products...and other Neat Stuff *by Michael Creeden*
3-M-dous! The latest from MichTron, MicroEd and Mindscape

The Video Desk *by Larry White*
The Amiga meets Nikon Camera

Roomers *by The Bandito*
Magneto-optical disks on the Horizon?... Amiga first stop for WordPerfect 6.0?...and the HAM paint wars continue.



April 1989 Volume 4.4

AMAZING FEATURES

AmiEXPO NY '89 *by Steve Gillmor*
Amiga takes a bite out of the Big Apple.

AmiEXPO Art and Video Contest Winners *by Steve Jacobs*
Mouse & monitor replaced brush & canvas in this first-ever AmiEXPO art event.

Adding the Not-So-Hard Disk *by J P. Twardy*
Short on memory? Installing a Hard Drive was never so easy—or so cheap.

Hard Drives—an Introduction *by Jon A. Boulle*
A straightforward, "no-Boulle" comparison of Hard Drives.

AMAZING REVIEWS

Tax Break *by Kim Schaffer*
OXXI's new tax program.

The Max Hard Drive Kit *by Donald W. Morgan*
Another inexpensive Hard Drive installation project, this time using Palomax's Max kit.

Menace *reviewed by Jeffrey Scott Hall*
Blast aliens & destroy the evil Draconia.

AMAZING PROGRAMMING

Sync Tips *by Oran J. Sands*
Oran presents a clearer picture regarding video and computer resolutions.

Passing Arguments *by Brian Zupke*
AmigaBASIC subprogram explains step-by-step how to pass data from the CLI to AmigaBASIC.

C Notes from the C Group *by Stephen Kemp*
A humorous view of the wacky world of programmers.

Creating a Shared Library *by John Baez*
Program for increased Amiga productivity.

MultiSort *by Steve Faiwiszewski*
Put your data in its place with this ultra organizing program.

AMAZING COLUMNS

New Products and Other Neat Stuff *by Michael Creeden*
Face-off with Gretsky, play Picasso with Basic Art Encoder, balance your Desktop Budget, plus more.

Snapshot *by R. Brad Andrews*
Four exciting Amiga games are reviewed .

Roomers *by The Bandito*
Amiga developers go for the bucks, Commodore stock up, & Paint Wars.

Bug Bytes *by John Steiner*
Soft-Logik's PageStream, and more.

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- ○ 2. Amiga 2000
- ○ 3. Memory Expansion
- ○ 4. Hard Drive
- ○ 5. IBM Emulators (Sidecar or Bridgeboard)
- ○ 6. Printer
- ○ 7. Modem
- ○ 8. Music Tool
- ○ 9. Video Product
- ○ 10. Other

C. What Amiga software product do you plan to buy next?
- ○ 1. 'C' Language
- ○ 2. Forth Language
- ○ 3. Modula-2 Language
- ○ 4. Assembly Language
- ○ 5. BASIC Language
- ○ 6. Entertainment
- ○ 7. Telecommunications
- ○ 8. Spreadsheet
- ○ 9. Database
- ○ 10. Financial
- ○ 11. Video
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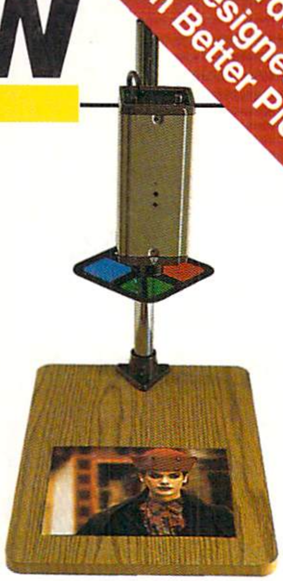

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